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- Houdini materials
- Chillblast review
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SUPERCHARGE YOUR RENDERS

- 9 pages of incredible techniques
- 2 expert step-by-step guides
- 5 professional apps deconstructed
- Top render farms explained

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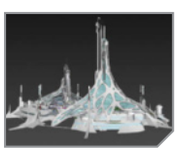

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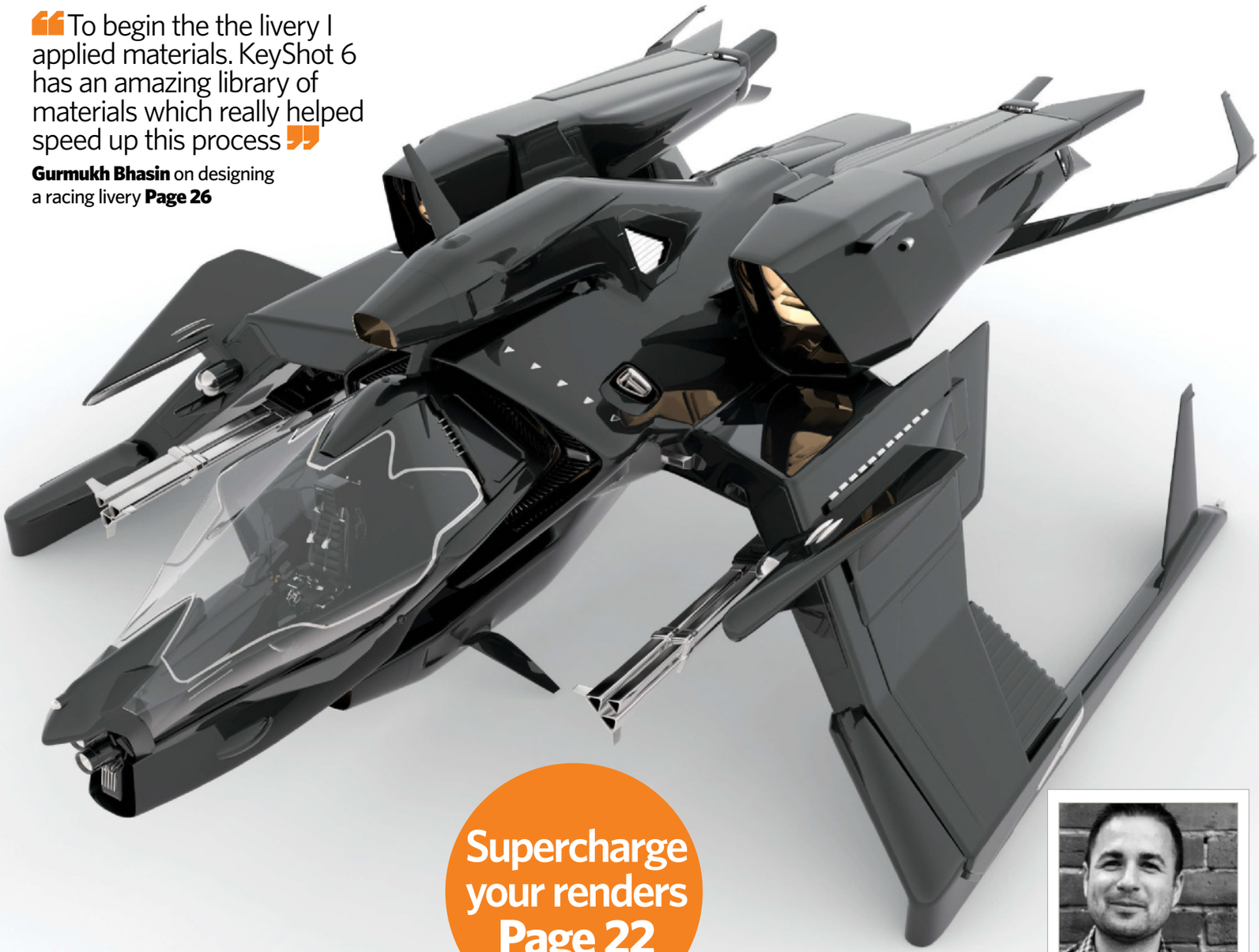
“To begin the the livery I applied materials. KeyShot 6 has an amazing library of materials which really helped speed up this process”

Gurmukh Bhasin on designing a racing livery **Page 26**



Supercharge your renders Page 22

Gurmukh Bhasin
gurmukhbhasin.com

Software Maya, KeyShot and Photoshop

David Hobbins
davidhobbins.com

Software Maya, KeyShot and Photoshop

Mix hard surfaces & organic modelling **Page 58**

Welcome

To the magazine and 100 pages of amazing 3D

Welcome to **3D Artist**! Farewell 2015 – it's been fun. So much has happened in the last year, but here are a few things to jog your memory (and mine).

In January, Pixologic finally launched ZBrush 4R7. In April, Autodesk responded with Maya 2016 and 3ds Max 2016, both of which were fantastic. Maxon released a new Cinema 4D, two Houdini updates appeared and the Blender guys made a movie. We've seen several new contenders step up to the plate, with tools like Redshift, Corona and Substance becoming more and more prominent in the industry with each day that passes.

We've seen videogame devs achieve unbelievable levels of detail, with games like *The Order: 1886* and *Metal Gear Solid V* pushing the boundaries of fidelity in videogame art. On the silver screen we've witnessed the return of Pixar with *Inside Out* and *The Good Dinosaur*, in the year that *Toy Story* celebrates its 20th birthday. We've experienced the cutting edge in computer graphics across film and TV in 2015, and it can only get better.

We've been there to cover all of this and more, and I can't wait to get stuck into the next 12 months. New tools, new techniques, VR, 3D printing – it's all going to kick off in a big way. See you in 2016!

Steve Holmes, Editor

Sign up, share your art and chat to other artists at **www.3dartistonline.com**

Get in touch... 3dartist@imagine-publishing.co.uk @3DArtist Facebook.com/3DArtistMagazine

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www.3dartistonline.com
www.greatdigitalmags.com

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13-issue subscription (Europe) – £70
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Head of Circulation Darren Pearce ☎ 01202 586200

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Printing & Distribution
Printed by William Gibbons & Sons Ltd, 26 Planetary Road, Willenhall, West Midlands, WV13 3XT

Distributed in the UK, Eire & the Rest of the World by Marketforce, 5 Churchill Place, Canary Wharf, London E14 5HU
☎ 0203 787 9060, www.marketforce.co.uk

Distributed in Australia by Network Services (a division of Bauer Media Group), Level 21 Civic Tower, 66-68 Goulburn Street, Sydney, New South Wales 2000, Australia ☎ +61 2 8667 5288

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CINEMA 4D
Release 17

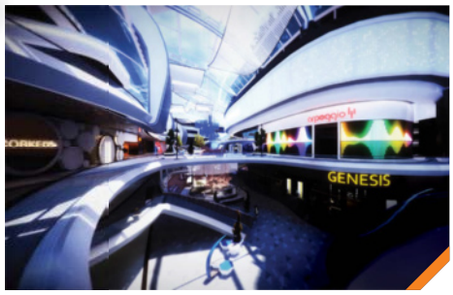
www.maxon.net

The Expert Panel

This issue's team of pro artists...

GURMUKH BHASIN
gurmukhbhasin.com

Head over to our rendering feature on p22 to find out how Gurmukh added the finishing touches to our incredible *Star Citizen* cover image, with the help of modeller David Hobbins.
3DArtist username Gurmukh



ADAM SIMONAR
pamelagame.com

It's been far, far too long since we've gotten stuck into a game engine, so Adam has come along to show you how to develop stunning science-fiction environments in Unity.
3DArtist username asimonar

NICOLAS DELILLE
modern-age-studio.com

Nicolas returns to the pages of 3D Artist with another Cinema 4D masterclass, this time focusing on one of the strangest bugs we've ever seen. It's really weird and really awesome. Check it out on p50.
3DArtist username ModernAgeStudio

MARIANO TAZZIOLI
artstation.com/artist/mtazzioli96

Still super young, still super talented, Mariano dives into an interesting ZBrush workflow over on p58, showing you how to build a hard-surface robot based on more organic forms.
3DArtist username n/a

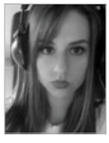
RAINER DUDA
rainer-d.de

Christmas is just about over now, but to celebrate the holiday season Rainer has based his superb PBR materials tutorial on some good old fashioned Christmas baubles! You'll find it on p66.
3DArtist username Rainerd

MATTHEW TREVELYAN JOHNS
artstation.com/artist/trevelyan

Hailing from a talented team at Cloud Imperium Games – the guys behind *Star Citizen* – Matthew shows you how to build a real-time prop that's perfect for videogames on p74.
3DArtist username trevelyan

VICTORIA GOLDSMITH
lowpolyfish.com



We're always on the hunt for artists that do something a little differently. Victoria combines 3D techniques with Adobe Illustrator to develop an interesting, colourful papercraft style on p78.
3DArtist username lowpolyfish

PAUL H PAULINO
paulhpaulino.com

MARI is a really useful tool, something that Paul explains over on p70 in his advanced texturing tutorial. Discover key look-dev techniques and production-proven texture tricks.
3DArtist username paulhpaulino

ORESTIS BASTOUNIS
twitter.com/mrbastounis

For some reason we let Orestis have a month off last issue. He hasn't gotten away with it again – on p82 he casts an expert eye over the Chillblast Fusion Render OC M4000 workstation.
3DArtist username n/a

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/chillblast @chillblast

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Orestis Bastounis delivers his verdict on this new workstation from the popular UK-based retailer

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Martin Bosak explains his approach to modelling an amazing crossbow in Maya and ZBrush

"The multipass system is robust and really useful, even if it's just for cleaning up areas in post-production"

Matt Frodsham on using multipass to power up OctaneRender **Page 29**

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Houdini 15 PBR Shaders

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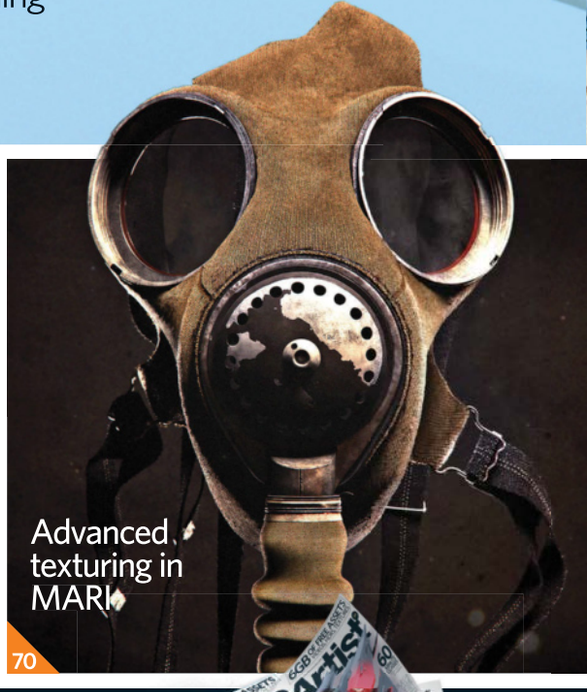

Advanced texturing in MARI

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Papercraft in Maya

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"The Blender owned sIBL GUI is an external add-on to help you with managing HDRI maps"

Otávio Henrique Junqueira Amorim reveals how to make Blender even more efficient
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Turn to **page 96** for the complete list of this issue's **free downloads**

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The Gallery

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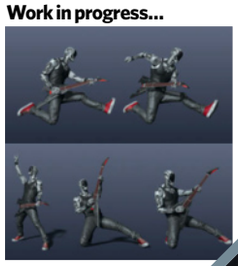
Marco Plouffe
marcoplouffe.com
keosmasons.com

Marco studied character modelling in 2009 and it's been his job and passion since then

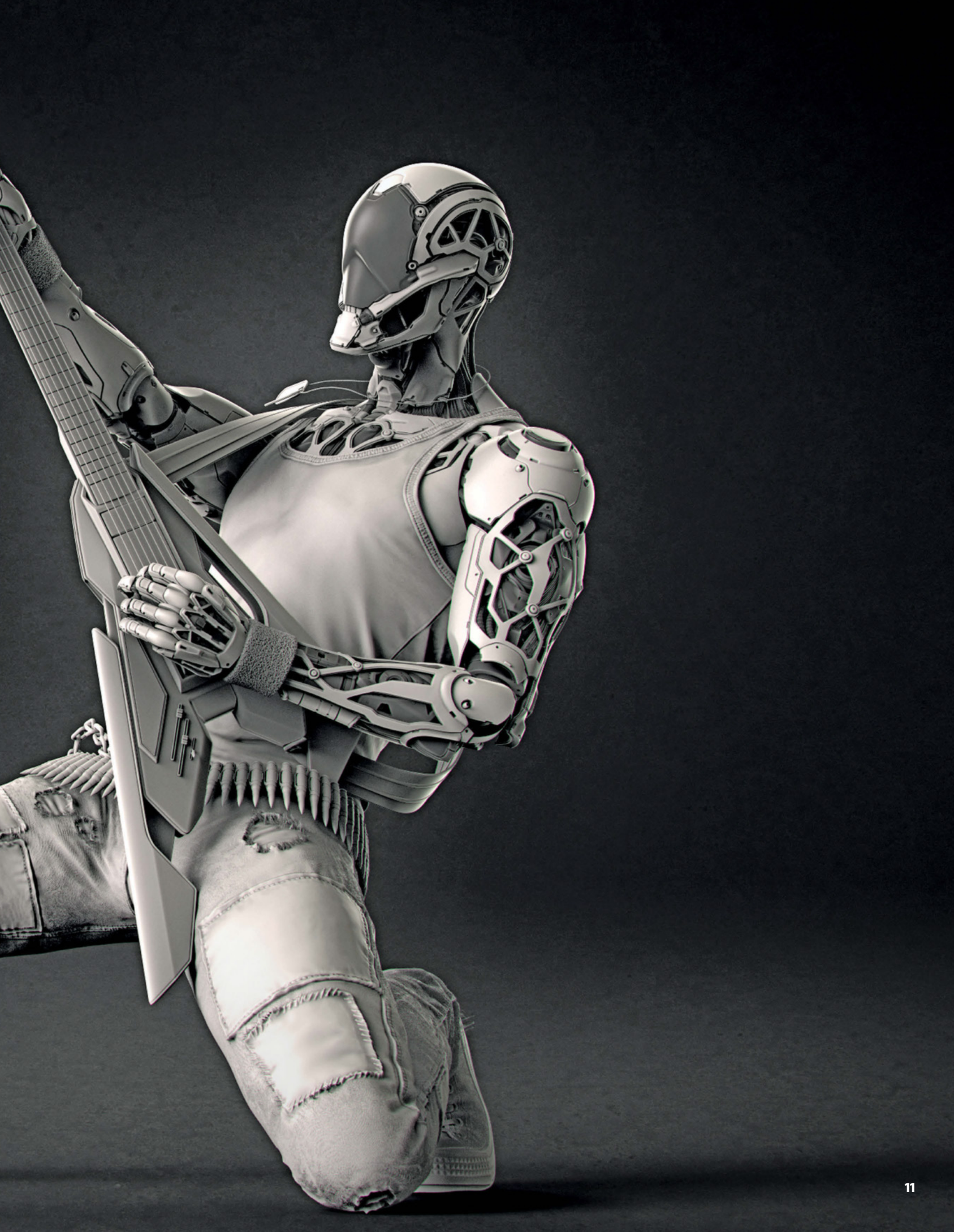
Software ZBrush, KeyShot, Photoshop

Work in progress...



"The idea was to represent how sentient robots of the future will still celebrate Eighties metal culture. I'm a huge rock/metal fan so I wanted to pay tribute to some bands I like. My idea came from the quote "the metal will live on" from a Tenacious D song"

Marco Plouffe, *Rockerbot,* 2015



“I wanted to create a series of robotic organs. Among them is a futuristic heart – an eternal motor, that would be a lifesaver for humanity. Also, it was a test to see if I can work with a medical theme in 3D”

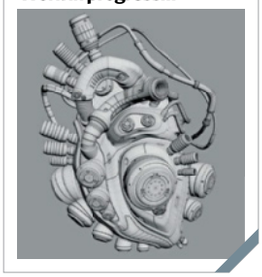
Vladislav Ociacia,
Heart, 2015

Vladislav Ociacia
bulldozer-vfx.com

Vladislav is a concept modeller whose visual design fascination began in 2005

Software 3ds Max, V-Ray, Photoshop

Work in progress...



> “I wanted to challenge myself – with a female dancer, there's a mix between strength and beauty. It's important to have proper underlying anatomy and form, while retaining the softness of her figure”
>
> **Alex Lincoln,** *The Dancer,* 2014

Alex Lincoln
Alincoln3d.com

Alex is a freelance CG artist who looks forward to the next idea and creating visual narratives

Software Maya, ZBrush, MARI

Work in progress...

Oskar Füleki
visumetrie.de

3DArtistOnline username:
Visumetrie

Software Cinema 4D, V-Ray, Photoshop

Work in progress...

"On a cold January day in 2015 I aimed to create an image of a cosy bedroom with a warm and comforting sentiment. The focus of my work here was placed on the atmosphere; especially the mood in the lighting. My goal was to produce a photorealistic rendering of an interior scene"

Oskar Füleki,
Bedroom, 2015

Carsten Stüben
carstenstueben.com

Carsten has been working as a creative director in a packaging design agency for nine years

Software ZBrush, OctaneRender

Alternate render...

"This image is part of a range of DynaMesh sketches, which I created in my spare time. If there is one theme which has been illustrated too often, it's dragons. But I think it´s not important *what* you create, but how. It´s about reinterpreting the familiar and enhancing it with a personal touch. So here is my version"

Carsten Stüben, *Dragon,* 2015

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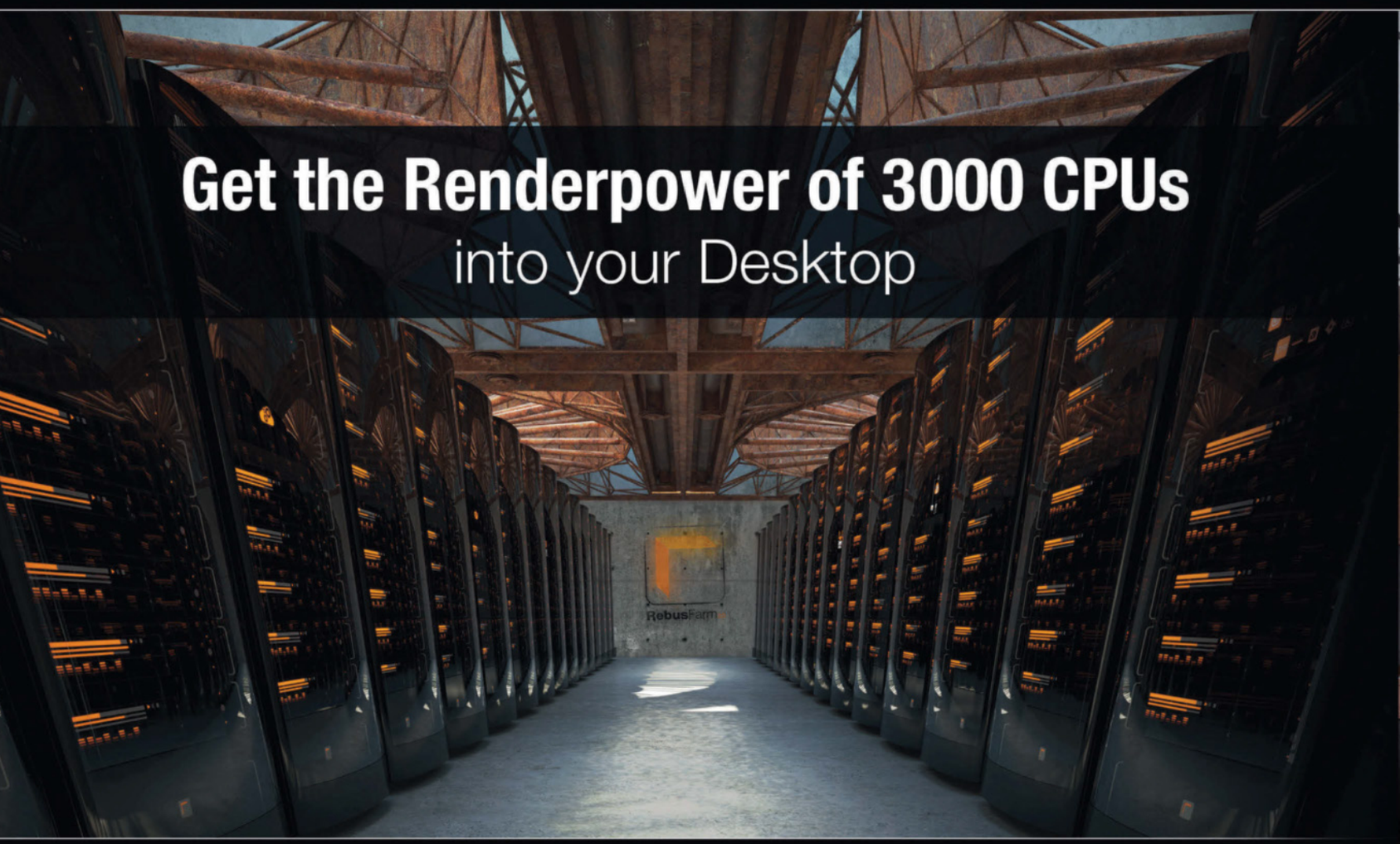

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This stunning image was created by RebusFarm user Saeed Amiri, CG artist from Iran. He has been working in architecture visualization for 7 years now. The image "Cabin House" was created with 3ds Max, ZBrush, V-Ray, Photoshop and was rendered at RebusFarm.

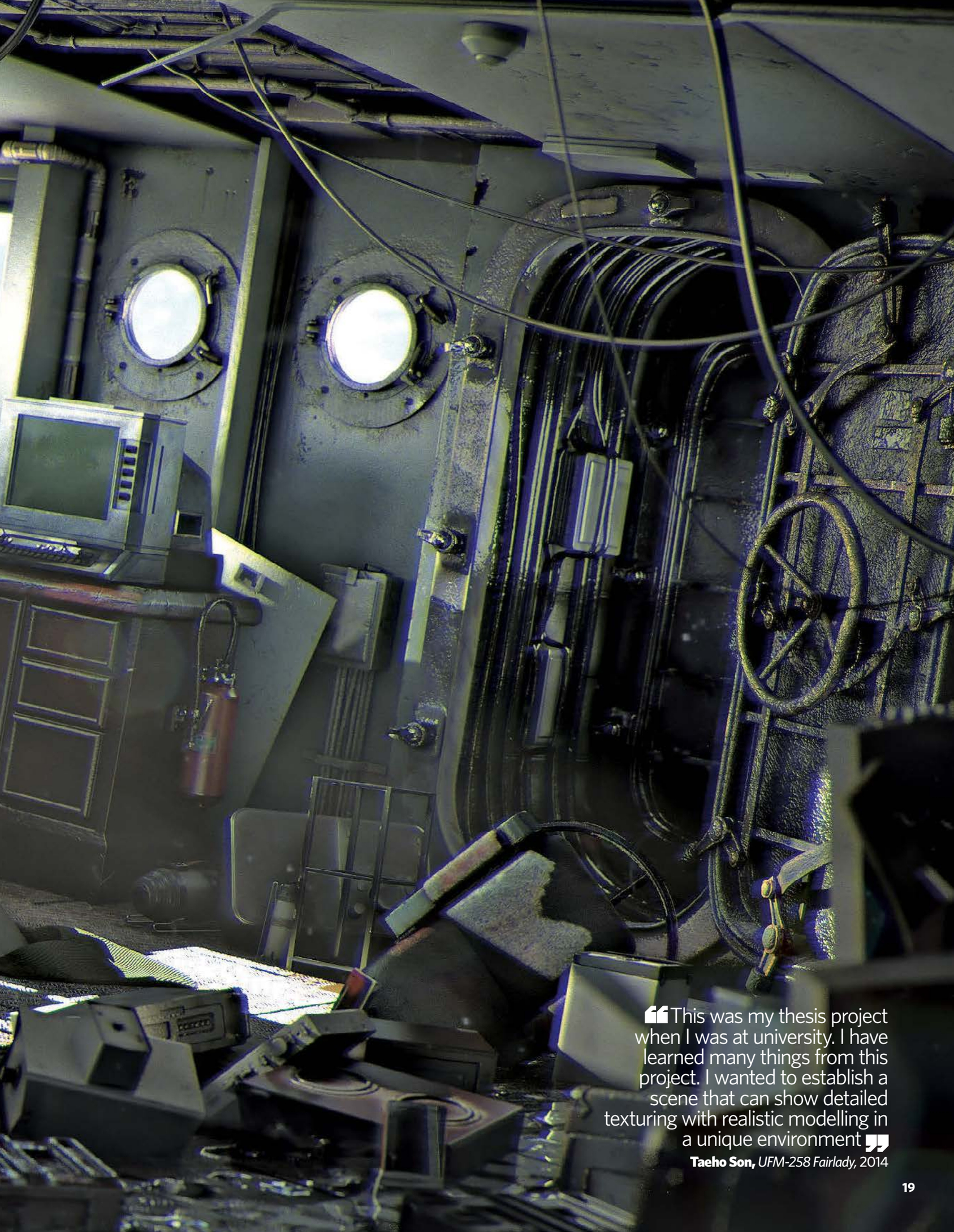
If you want to see more of Saeed's work, go check out his website: **be.net/saeedamiri**

Taeho Son
taehoson.com

3DArtistOnline username:
Neoptimist

Software Maya, Mudbox, RealFlow, V-Ray, NUKE, Photoshop

Work in progress...



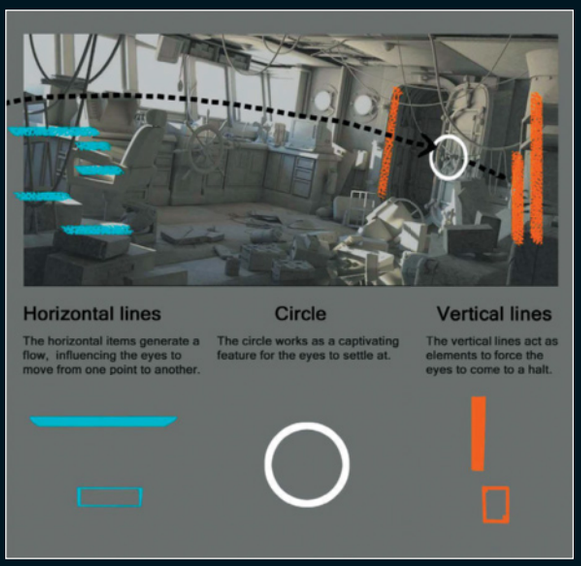
“This was my thesis project when I was at university. I have learned many things from this project. I wanted to establish a scene that can show detailed texturing with realistic modelling in a unique environment”

Taeho Son, *UFM-258 Fairlady,* 2014

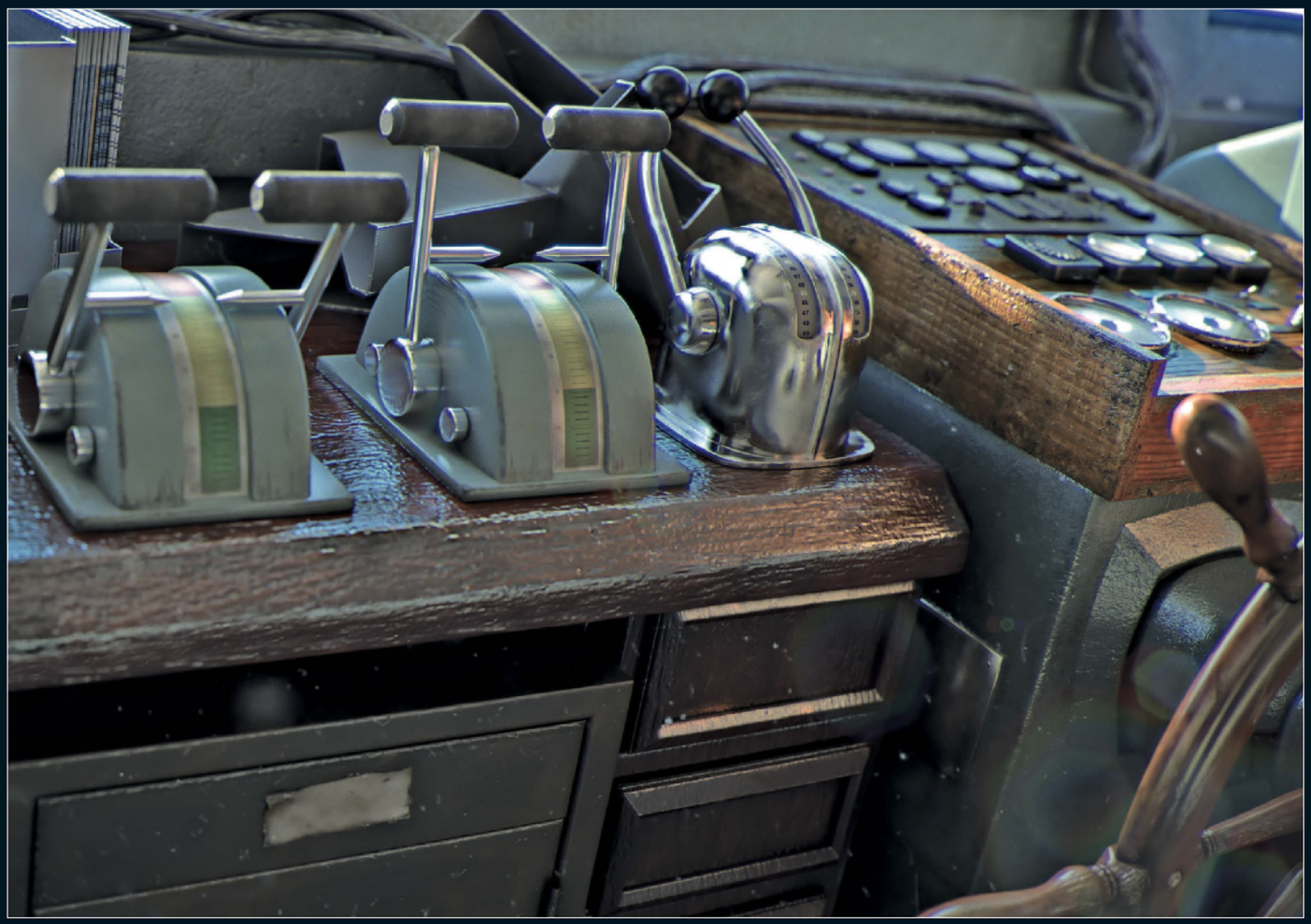
> The scene takes place inside of a cabin interior of a wrecked ship. The ship is sunken and tilted to the side. From this project, I wanted to create an area where the whole place is abandoned but interesting

Taeho Son, *UFM-258 Fairlady,* 2014

INSPIRATION
ABOVE The whole ship was inspired from my experience when I saw a cruise ship rolled over to the side from a massive storm. It was an amazing experience. I was also inspired by videogames like *Call Of Duty* and the *Uncharted* series.


Horizontal lines
The horizontal items generate a flow, influencing the eyes to move from one point to another.
Circle
The circle works as a captivating feature for the eyes to settle at.
Vertical lines
The vertical lines act as elements to force the eyes to come to a halt.

COMPOSITION
LEFT Personally, I always think that the composition and layout are some of the most vital things for a piece of art. I tried to make a natural flow for the eye with the shapes of objects and the layout. In this example, the horizontal items generate a flow, influencing the eyes to move from one point to another. The circle works as a captivating feature for the eyes to settle at. The vertical lines act as elements to force the eyes to come to a halt.



FOREGROUND OBJECTS
ABOVE To create a depth of field effect, I placed several props in the foreground. I used VRayPhysicalCamera to adjust settings like focal length and field of view.

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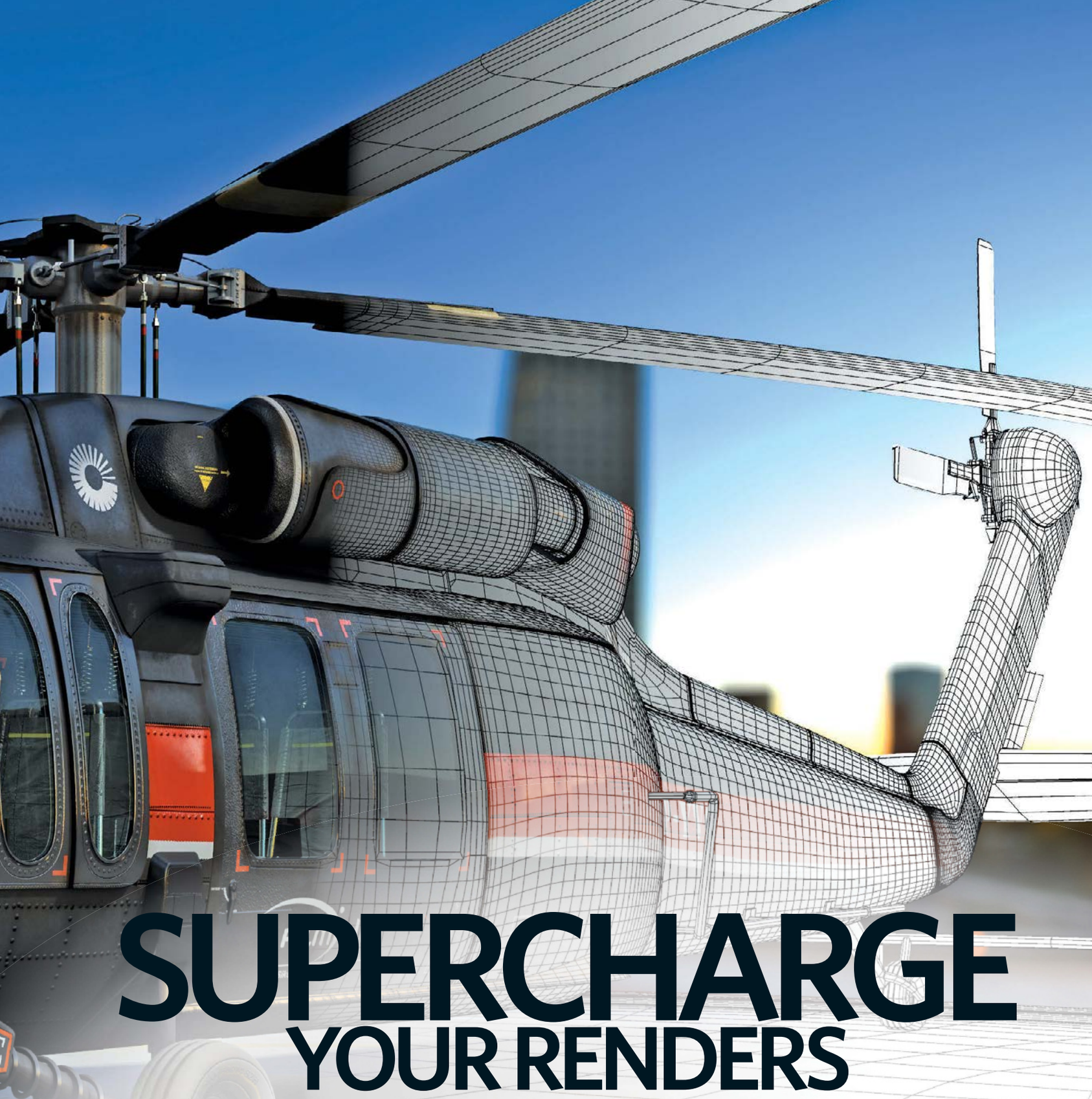


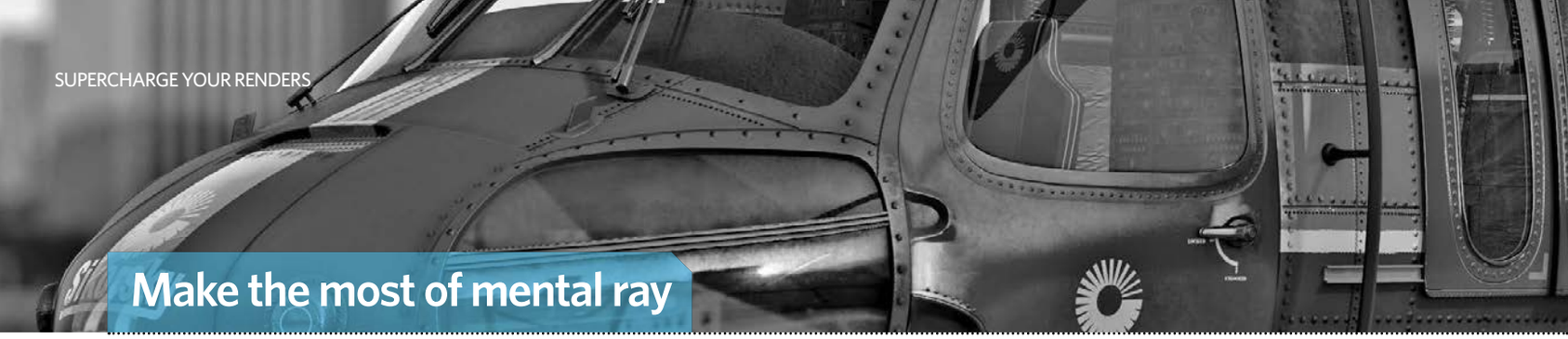
SUPERCHARGE YOUR RENDERS

Rendering speeds can make or break a production. Our experts explain how to take control of your renders and achieve fantastic results

Achieving photorealism is "the greatest challenge for most 3D artists," says freelancer Steve Wilson. Artist and author Jamie Cardoso agrees, adding "One of the biggest challenges today is to make 3D exterior shots look as realistic as the interior ones."

For this challenge Cardoso has a set of rules, applicable whatever the renderer. He "uses amazing real photo references as the main source of inspiration for art direction, materials/shaders, lighting, colours, cameras and composition." He also "ensures there is always a clear definition between bright and dark areas in the scene by visually emphasising where the main light source is originating from." And where possible he "adds compelling skies in post. Amazing skies usually help 'sell' external shots."

It's a matter of balance; the following expert tips will help you learn the software, but don't forget to feed your art too. As Wilson points out: "When you are a 3D artist you suddenly become aware of the smallest of details. The way the light hits an object: the dirt, scratches and layers of paint that have peeled off over time. Trying to achieve photorealism is a matter of being observant to the minutest of detail. I'm always looking at the world trying to work out how I could achieve that in 3D. It has become a habit."

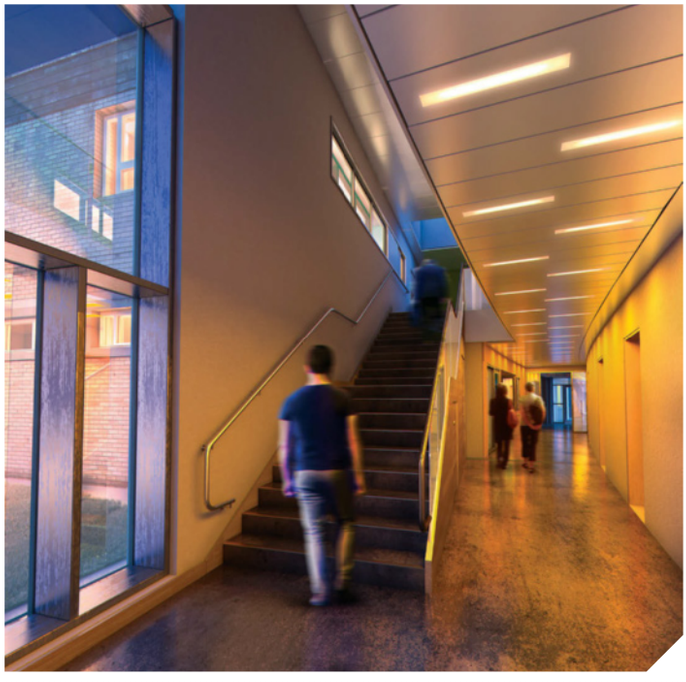


Make the most of mental ray

Raise your rays

"Save the FG map at a smaller render output, followed by reusing the saved FG map to render the final big output. While saving, set parameters high (eg Initial FG Point Density set to 0.8 and Rays Per FG Point set to 300)."

JAMIE CARDOSO



All in an instance

"Always use mental ray proxies in 'heavy' scenes, and try to have most proxies as one instance if possible. Instanced proxies will use less memory to render."

JAMIE CARDOSO

Get your lookdev right

"When you're doing your lookdev, instead of plugging your specular map inside the Specular, connect it to the Specular Color and use the Specular value as a multiplier."

DAVIDE DONI

The same raw material

"The material you want to use inside mental ray is almost always the mia_material_x_passes. With this you can achieve most glossy, matte or transparent materials."

DAVIDE DONI

Light splitting with IBL

"Set the image to Texture and colour to white. Tick Adjust Final Gather Color Effects and Adjust Environment Color Effects. Load a small HDRI, then the full res for reflections."

DAVIDE DONI

Highlight best features

"Glossy highlights play an important role in making an image more appealing. Increasing 'Relative Intensity of Highlights' can help accentuate glossy highlight effects."

JAMIE CARDOSO

Use motion blur without deforming

"Test [motion blur] in No Deformation mode, which takes into account the whole object. When finished, turn on Full Deformation."

DAVIDE DONI

Correct glossy artifacts with glossy interpolation

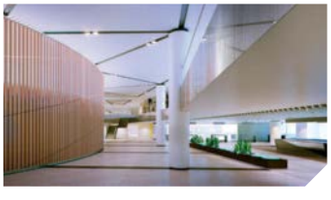
"Use 1, or higher, in conjunction with relatively good Sampling Quality values. Also, enable 'Highlights+FG only', under the Reflection group."

JAMIE CARDOSO

Don't make your luminance Unitless

"Glossy artifacts may be due to glowed objects set to Unitless. To fix this, set as Physical units (cd/m2) and increase the default value."

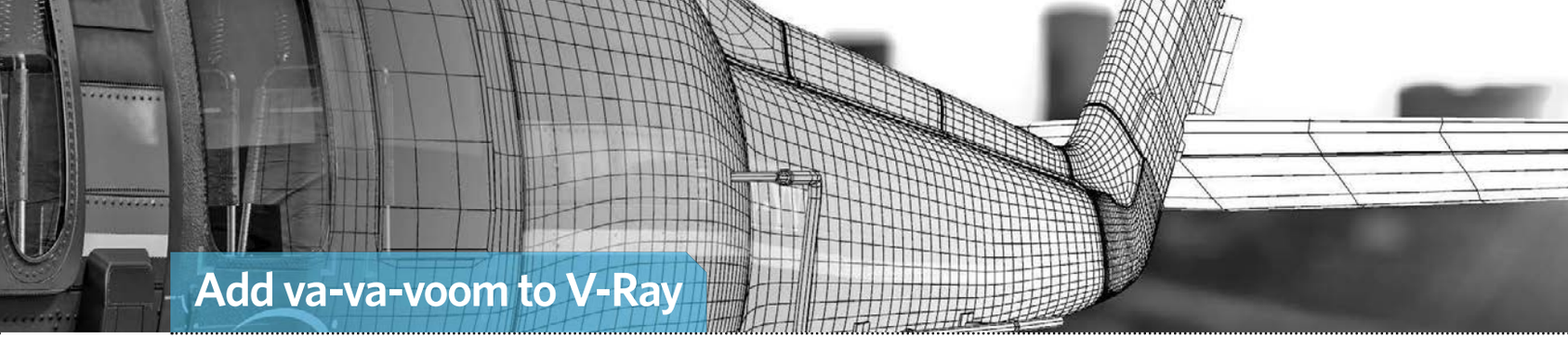
JAMIE CARDOSO



Alpha is luminance

"Usually, mental ray likes maps with alpha channels. Since in most cases we are using maps with white or no alpha channel, after you add in a map for specular or gloss remember to check Alpha Is Luminance in Color Balance."

DAVIDE DONI



Add va-va-voom to V-Ray

Give V-Ray a hand

"Heavy scenes with hundreds of separate objects become heavy to handle, so I try to bake and combine as many meshes as possible to help V-Ray out."

DAVID FLAMHOLC

Create product visuals with V-RayRT

"This lets me position lights, select an HDRI and set up composition. It supports the main V-Ray render engine to speed up production."

STEVE WILSON

Keep it in the real world

"I model to scale in real-world units. It avoids problems with renders, gains render speed and looks better, as V-Ray lights are calibrated to work with real sizes and distances."

DAVID FLAMHOLC

Use V-Ray meshes for high geometry scenes

"I often use V-Ray meshes when producing complex arch-vis scenes. Using it with MultiScatter or Forest Pro can quickly populate areas."

STEVE WILSON

If you have to make a deadline...

"When the quality level is acceptable, use the V-Ray ambient light with a VRayExtratex texture inside to create a fake GI. Turning GI off elimates a lot of issues with flickering and can reduce render times substantially."

STEVE WILSON

Don't sphere yourself in

"Don't create a huge sphere around a simple scene for a sky or a backdrop. This creates an interior and slows the render. I've sped up renders from 20 mins per frame to 1 min per frame by just replacing the enclosing sphere."

DAVID FLAMHOLC

Render as you go

"Make simple versions of shaders and materials to avoid creating render bottlenecks. [This avoids] render problems in unbalanced lighting and GI flicker."

DAVID FLAMHOLC

Go the extra mile...

"VRayEdgeTex is a great procedural shader that creates fillets on object edges without geometry fillets. It can be the difference when trying to achieve photorealism."

STEVE WILSON

Don't starve V-Ray

"Get your general DMC AA correct with the Sample Rate pass. Get the lowest value above 16 – even at a value up to 250. Then dial in your lights and reflection subdivs."

DAVID FLAMHOLC

Embrace dome lights

"When carrying out exterior animations I use a VRay Dome for reflections by turning off diffuse in the light options. I then create a VRaySun or Sky for main lighting."

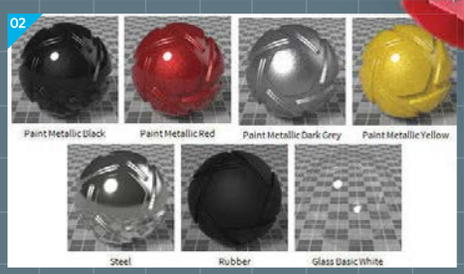
STEVE WILSON

Rendering a racing livery for a Star Citizen spaceship

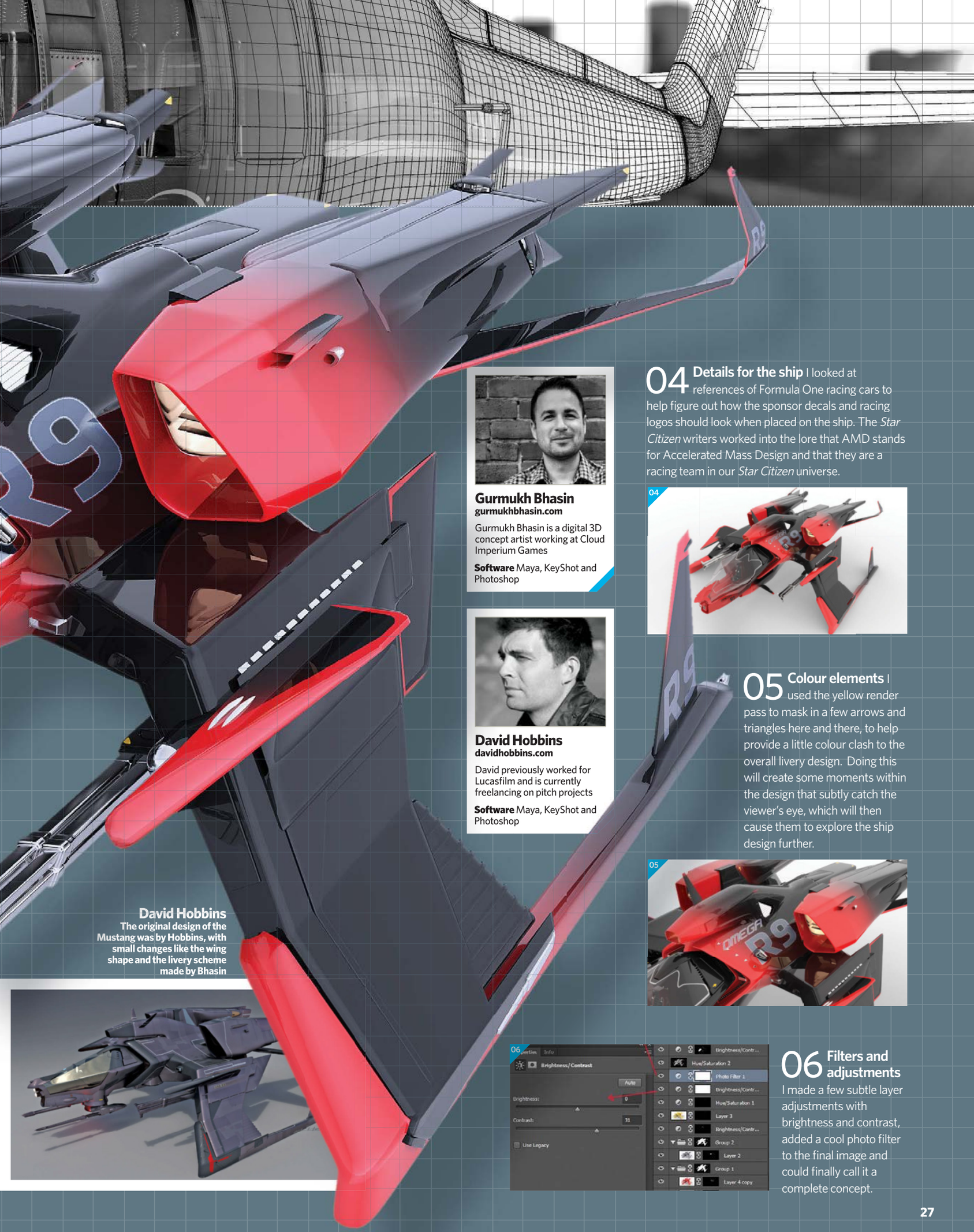
Get to grips with production-proven rendering techniques that will grease the wheels of your workflow

01 Reworking an existing model This beautiful ship, the Mustang Omega, was originally designed by David Hobbins as the Mustang Alpha for the *Star Citizen* universe. My task was to take the Mustang Alpha (single-seat fighter) and do a quick redesign to turn it into a racer. I was only allowed to change a few parts of the original design to give this ship a whole new racing feel, so the livery design played a large role in making this ship take on a new personality.

02 Choose the colours The colour scheme for the Mustang Omega was chosen as red and black because this ship was created as a partnership with AMD and *Star Citizen*. Red and black are AMD's flagship colours. To begin the design of the livery I applied the basic materials. KeyShot 6 has an amazing library of prebuilt materials which really helped speed up this process. I applied steel, glass, rubber, warm emissive glow and a shiny metallic black paint to the ship. I used the grey studio HDR that comes with KeyShot for the environment lighting. I did four renders of the ship with different colour materials applied (black, red, grey and yellow) that I will eventually composite in Photoshop.



03 Layer in Photoshop In Photoshop I brought in all the different colour ship renders and layer them on top of each other. I used the black ship render as the base colour for the ship and started masking in the red ship render with a soft Photoshop brush. I like being able to easily control how much the red colour fades to black with a quick brush stroke, giving me lots of freedom to change the design of the livery as I see fit.



Gurmukh Bhasin
gurmukhbhasin.com

Gurmukh Bhasin is a digital 3D concept artist working at Cloud Imperium Games

Software Maya, KeyShot and Photoshop

David Hobbins
davidhobbins.com

David previously worked for Lucasfilm and is currently freelancing on pitch projects

Software Maya, KeyShot and Photoshop

04 Details for the ship

I looked at references of Formula One racing cars to help figure out how the sponsor decals and racing logos should look when placed on the ship. The *Star Citizen* writers worked into the lore that AMD stands for Accelerated Mass Design and that they are a racing team in our *Star Citizen* universe.

05 Colour elements

I used the yellow render pass to mask in a few arrows and triangles here and there, to help provide a little colour clash to the overall livery design. Doing this will create some moments within the design that subtly catch the viewer's eye, which will then cause them to explore the ship design further.

David Hobbins
The original design of the Mustang was by Hobbins, with small changes like the wing shape and the livery scheme made by Bhasin

06 Filters and adjustments

I made a few subtle layer adjustments with brightness and contrast, added a cool photo filter to the final image and could finally call it a complete concept.

Keep up with KeyShot

Pick an HDRI that fits

"The best results come when the HDRI has a diffuse light and hard light sources (eg a garage with neon lights and the reflected light of a wall) for a good balance."

MARIO MALAGRINO

Get enough gamma

" Not crazy about how the light seems to be fading out your materials? Use gamma. This can be edited in post but you can also set it up in KeyShot and be done with it."

SHAWN RABENSBURG

Set up (and save) multiple cameras

"My typical setup is to have a centred camera on each side and the top, then four or five angled or close-up cameras."

SHAWN RABENSBURG

Use materials with a little highlight

"This makes sure that even sharp corners are slightly highlighted. Materials that have no highlight give very flat results."

MARIO MALAGRINO

Remember to put in ground reflections

"It is the details that will make your work stand out. So what I suggest to you is to add at least a bit of reflection to the ground and blur it to 50 per cent. You will love the results, especially on darker backgrounds."

MARIO MALAGRINO

Use depth passes rather than depth of field

"By using a depth pass you can import your render into Photoshop and add the pass as an alpha channel, which will allow you to set the focus by altering the exposure and using lens blur to control your focal point."

SHAWN RABENSBURG

Create your own softbox and photo studio

"Basically, this should simulate a photography studio for more control over reflections of the environment on the objects that are in it."

MARIO MALAGRINO

Use your ambient occlusion wisely

"However decent a render seems, you will pull out more details with an ambient occlusion pass to combine in Photoshop."

MARIO MALAGRINO

Bevel your edges

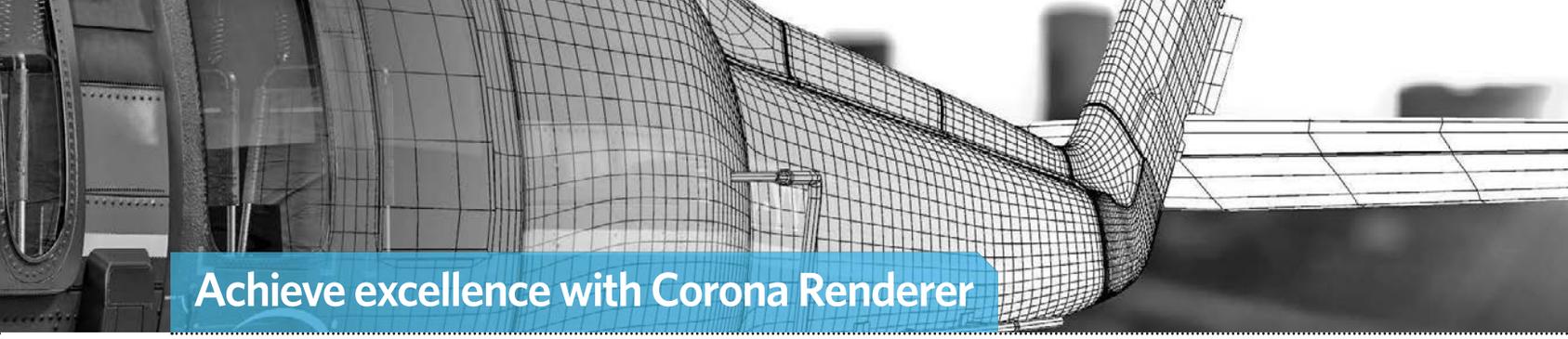
"By bevelling your edges and angles, you allow your light source to create more realistic highlights on the surface of your model where there are angles or where edges meet."

SHAWN RABENSBURG

Don't aim for perfection

"If the goal is to make something look like you took a picture of it, keep in mind that most cameras will not produce a 'perfect' image. Emulate this."

SHAWN RABENSBURG



Achieve excellence with Corona Renderer

Create materials with interactive confidence

"When I'm creating materials and lighting, Interactive Rendering is always turned on. It supports features like final frame rendering. It has no memory limitations, it's fast and finally, it supports region rendering."

ONDREJ POTANČOK

Give products that believably perfect gloss

"On product renders and closeups in interiors, I like to move GI vs AA balance to 4 to 6 to speed up depth of field or motion blur."

ONDREJ POTANČOK

Go default for caustic and glass rendering

"Caustic and glass rendering is always time-consuming, but not in Corona! Glass material can let you ignore caustics if it's unnecessary."

ONDREJ POTANČOK

Get your tone map on

"One helpful feature is real-time tone mapping. You can adjust exposure, highlight compression, contrast and more. This helped speed up workflow and save time."

ONDREJ POTANČOK

Selective rendering

"Advanced Render Select lets you tweak a single object in the scene without having to compute the rest. You can render objects with a black background for compositing."

ONDREJ POTANČOK

Create seriously high Octane work

Beware of not-so-useful passes

"Material IDs and Object IDs can be hard to control. Render Layer Mask can be assigned via a Layer ID with an Octane Object Tag."

MATT FRODSHAM

When not 'in-camera' use multipass

"The multipass system is robust and really useful, even if it's just for cleaning up areas in post-production on a per-layer basis. For example, noise often hides in refractions, which you can denoise without blurring your whole image."

MATT FRODSHAM

Work smarter

"Leverage out of the core texture functionality to keep textures in system RAM instead of the GPUs vRAM. Rendering speed might drop slightly, but overall it will be possible to render seemingly impossible scenes even with cards that have very little video memory."

TOMGLIMPS

Optimise for repeat geometry

"Use proxies for repeated geometry to save valuable vRAM resources on your GPU, and keep scenes as light as possible. Generate CSV files using Phantom Scatter (written by Guus Thissen) for placing proxies exactly where you want them."

TOMGLIMPS

Prioritise your assets and time

"The Live Viewer is great for getting a feel for final render settings. For most attributes you can start at 0 then gradually increase values until you don't notice a difference – any higher and you're wasting render time."

MATT FRODSHAM

GPU VS CPU

Getting right back to basics, rendering is the process of creating an image from your 3D scene and all of its data. Traditionally, rendering was always done via the CPU (central processing unit), but nowadays, a variety of studios are making the move to GPU rendering, looking to super-fast solutions like Redshift and Octane. It's worth remembering, though, that these are two different processes, and that there are quality considerations when thinking about rendering as well as any concerns you have about speed. When deadline comes knocking you'll be after a fast solution, but don't forget that quality is key.

"I haven't had a lot of experience with GPU rendering," admits Steve Wilson, "but I can see the potential. Octane is one of the first GPU-only renderers available. It lacks certain features that a CPU render engine [has] but I'm sure over time these features will be added.

"It is always a dream of any 3D artist to see results instantly. With instant feedback you can tweak more quickly and achieve a higher quality level. Given time, I'm sure GPU rendering will become the rendering process of choice."

MAKE YOUR RENDERS POP WITH PHOTOSHOP

MODEL BY Fateh Merrad (GrabCAD.com)

01 Render ready Do your initial render, and then try using the Color Lookup adjustment in Photoshop, advises Shawn Rabensburg. "It's deceptively simple," he says, "but it can have a huge impact on how your final image looks."

02 Tweak your colours "Simply add Color Lookup as a new adjustment layer (Layer>New Adjustment Layer>Color Lookup) and scroll through the 3DLUT files until you find a look that suits your image. By adding this as an adjustment layer, you are still able to adjust the opacity, layer order and so on, so you will have full control over how the final image winds up looking."

03 Breathe life into your image "Color Lookup uses presets that alter the colours in your image to create a certain type of look. Your image may still need some adjustments afterwards to [make] it perfect, but often this tool does a great job of breathing a bit of life into flat, dull images."

OUTSOURCE YOUR RENDERS

Render farms are a great way to see results quickly, without the need for a monster workstation at home or in the studio. Here are five to check out:

REBUSFARM

us.rebusfarm.net

Based in Germany, RebusFarm offers support for a wide array of 3D applications and has built a strong reputation for offering stability and speed at a reasonable cost. RebusFarm also runs a popular Artist of the Month competition that you can find on its blog.

GARAGEFARM.NET

garagefarm.net

GarageFarm claims to be the cheapest render farm around, and offers cool features like free test renders and multistep baking – these enable you to generate GI maps on multiple machines. You can try GarageFarm for free today without a subscription by going over to the website.

ZYNC

zyncrender.com

Used on over a dozen feature films since its inception including *Transformers: Dark Of The Moon*, Zync is now part of Google's Cloud Platform. At present Zync only supports Arnold for Maya, V-Ray for Maya and NUKE, but increased compatibility is on its way.

RENDERSTORM

render-storm.com

This is potentially where you want to head if you're a Blender user, as RenderStorm offers GPU rendering for Cycles as well as CPU rendering for V-Ray for Blender and Blender Render. Other major software, such as 3ds Max and Maya, is also supported at a CPU level.

RENDER ROCKET

renderrocket.com

This is another farm that offers test rendering to its customers, and it enables you to get a feel for the farm before committing to spending any money. As well as a powerful array of processor cores for you to utilise, Render Rocket also has a really handy web-based render manager.

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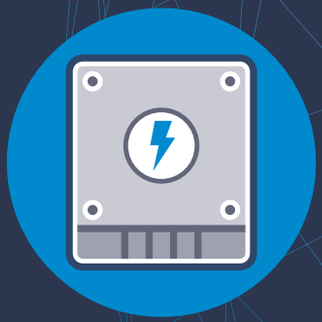

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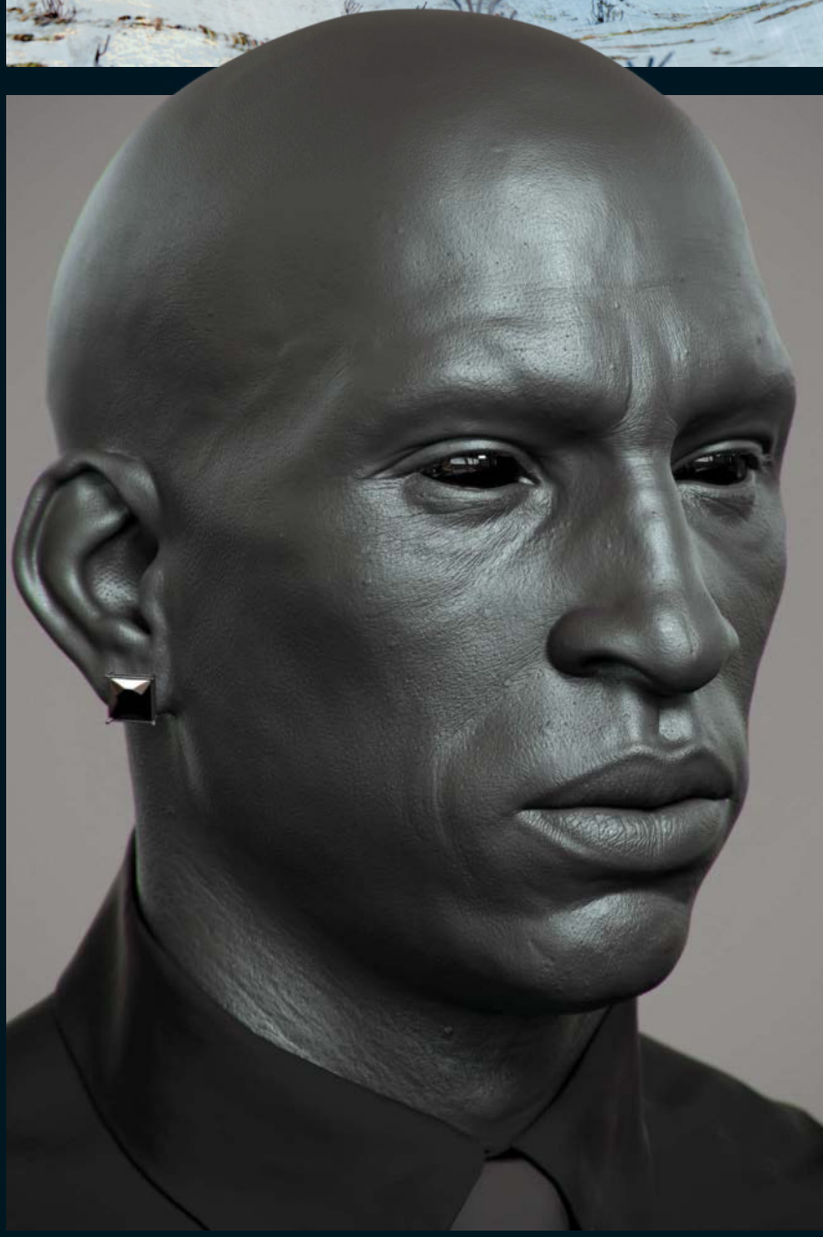
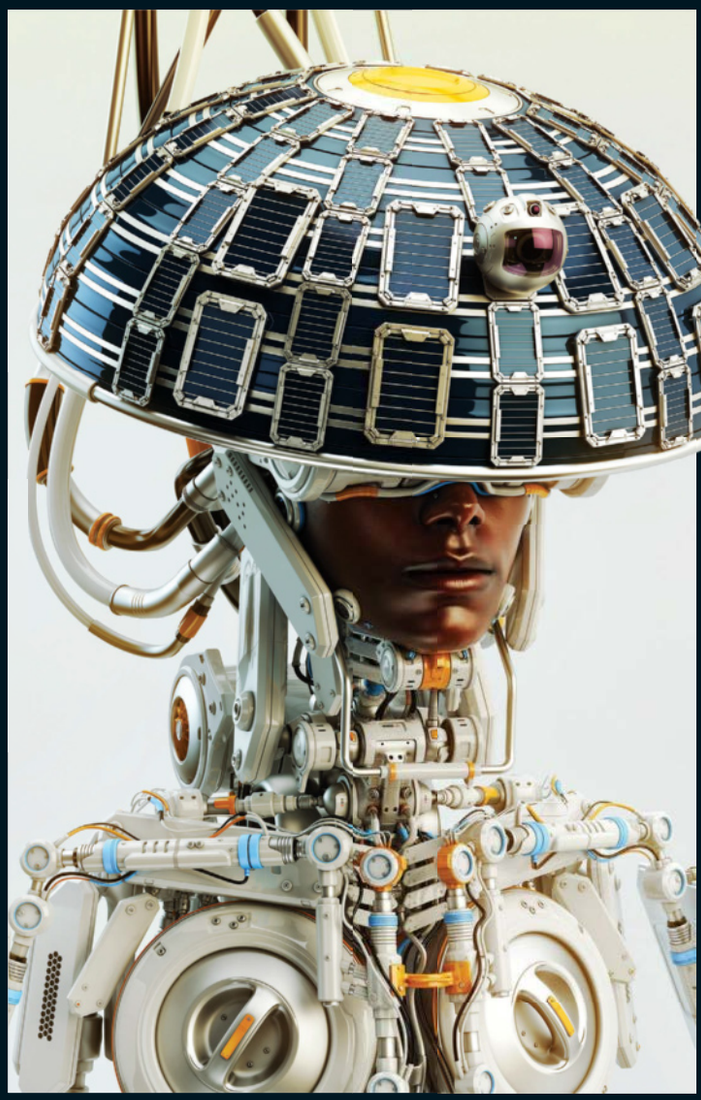




60 MINUTE FIXES

Experts share their quick step-by-step guides to help you upgrade your renders in under an hour

Creating high-quality, detailed artwork in 3D is invariably a time-consuming task so learning more productive workflows and quicker techniques to add an extra layer of polish to your work is a must. To help you surpass your goals, **3D Artist** asked six professional artists for their time-saving techniques that can be achieved in under an hour.

There are always aspects of your 3D work that can be tweaked or improved on, and over the course of these mini tutorials you'll discover battle-tested approaches, key techniques and also some software applications and resources you'll want to adopt into your own pipelines.

Erwan Mayel takes us through his character creation process using his Musketeer character, employing a broad range of software applications. Erwan shares the design considerations he chose to shape the final asset.

Otávio Henrique Junqueira Amorim provides his steps for realistic rendering with Blender using the Cycles renderer. This will include creating realistic and detailed materials, using a truck in a blizzard as an example.

Using his Afrosamurai robot, Vladislav Ociacia explains how his rendering and compositing pipeline, which uses V-Ray, Photoshop and After Effects, lets him tweak his final output for a variety of results.

With his recent head bust project as a case study, Jonas Skoog kicks off with how he created the initial sculpt and then shows us how to create tertiary details with hi-res displacement scans using ZBrush and MARI.

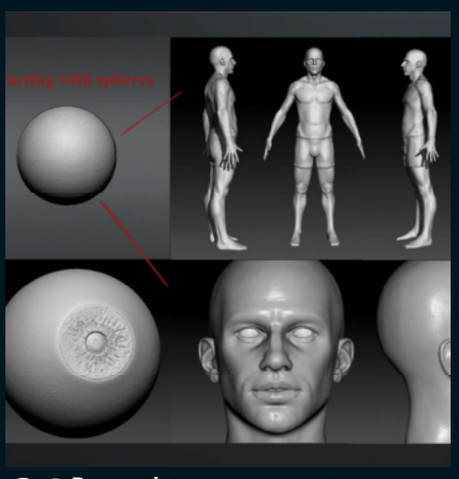
Last but not least, Laszlo Mandi and Robert Moore from Outpost VFX go through their workflow for creating seamless materials for a short film.

Quick character creation and texturing with ZBrush

ERWAN MAYEL is a character artist at Square Enix, Montreal
erwanmayel.dunked.com

I am going to show my character creation process using my Musketeer character, which I made as part of a personal project to help me improve my competencies. It was a challenge for me, mainly because I wanted to make an emotional character and implement all the techniques I have learned.

I'll introduce you to a quick step by step for my workflow with ZBrush, 3ds Max, Marvelous Designer, Quixel/Photoshop, Hair Farm and V-Ray. I chose to make a musketeer that is based on *The Three Musketeers*. It is a book that I read when I was younger.



01 Research This doesn't quite fit into the 60-minute workflow, but it's essential for going into the process of creating your character. Doing an image search can help to block a plausible concept. There are several websites available to find the necessary information. For my part, I used Pinterest. If you are drawing concept sketches to improve your idea on paper or on Photoshop before you begin sculpting, you can draw some silhouettes in black and white to improve your idea. Ultimately, the more research you have, the better equipped you will be with your project.

02 Design phase Do a first-pass blocking in ZBrush and make sure that everything begins with a sphere. The body does not have to be very detailed but should contain the necessary elements of the silhouette. For clothing, make a basic simulation with Marvelous Designer. For me it is the best clothing creation tool as it saves your production time and provides you with a more realistic result. It's really difficult and time consuming to create a pattern from scratch. One technique you can use is to create a rough clothing sculpt in ZBrush and mask the different parts from your cloth, and then unfold these parts to give you an idea of how the pattern should look. For research on this, you can look at patterns in sewing books and observe your own clothing materials. All clothing is made with logic so it helps to think about how the garment was built. To create a good fold you may need to spend a bit more time; stay patient, it's not easy and takes a few attempts to get a suitable result. Marvelous Designer generates a good simulation but if you want improve on the result further, return to ZBrush and rework problematic areas such as behind the knee and the armpit area, which are critical areas during simulation. Also, add details like stitches with custom brushes. I made my own but you can found a free brush set online with ease.

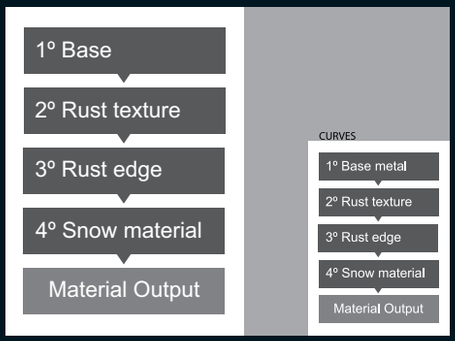
03 Texture and lighting There are a bunch of texture and lighting resources you can utilise to help you save time. I use Quixel SUITE as it's very useful when creating worn textiles and specific materials. If you want to create a worn texture, the best map to have for this is the Curvature map and you can generate this map by using xNormal. Another useful map is the Colour map; if you have everything on one mesh and you want to have many material effects on this then you must separate with solid colours. Different areas will be grouped with the same material. For painting skin, use texture references from **3D.sk.com** and project this using the Spotlight tool. Extrude skin details from the texture with 'Mask by Colour Intensity' and rework with the Skin brush. You can create the brush with a high-quality texture from the Surface Mimic website (**surfacemimic.com**). Now move quickly into testing the lighting of the scene and use 3ds Max with V-Ray because lighting is one of the most important aspects. Start with setting up dramatic lighting with shadows and rim lighting. The camera obscura technique was used by many Italian painters from the Renaissance to improve contrast. My full lighting setup uses an HDRI for ambient lighting and some directional lights to create some more contrast with the back light, rim light and soft light. Posing the Musketeer character is completed with the Transpose tool in ZBrush. It's vital to have a good topology for animation deformation and the posing is very important for the presentation of a character. The emotion must be within the gestures. This gives more credibility to the realism of the character. For this character, I chose a contrapposto pose, an Italian term that means counterpose. I use a lot of historical Italian references for all of the processes at this stage. Overall, the best advice I can give is to observe and learn from Italian and French master sculptors.

04 Hair system Hair is achieved with the Hair Farm plugin and rendered with VRayHairMtl. To make a more realistic hair system you must add some random messy hair into straight hair. With Hair Farm you have the opportunity to add modifiers as you want, to improve detail and messy hair. Don't forget to observe how hair and fur are in real life all around you. For the rest I use specific materials for each part because it helps me to create the best result. I used a seamless texture that I blended with the basic material texture to add detail into the reflectivity.

Create realistic materials with Blender and learn the importance of small details

OTÁVIO HENRIQUE JUNQUEIRA AMORIM
works in science communication with the creation of 3D animations in Brazil
otaviojamorim.blogspot.com.br

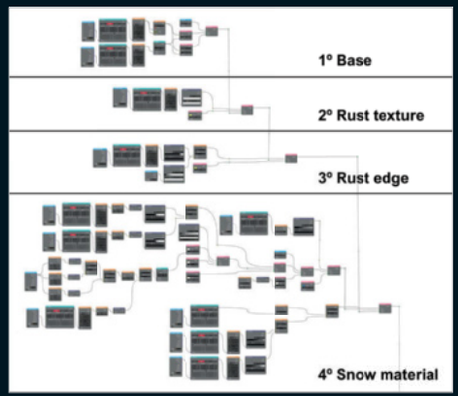
A realistic render depends not only on correct modelling and elaborate lighting, but also on a number of choices that are dependent among themselves. Creating realistic materials works in this way, and in this tutorial I present the importance of creating an organised structure of materials and small details like rust and friction marks. As an example I will use a material that has been created for a personal project, a truck in a blizzard modelled with Blender using the Cycles renderer.



01 Study the material image First, a search for references is done of the physical functioning of the material in metal and snow situations. This is so we can study the way the material absorbs, reflects or refracts the light and also the surface characteristics. It is possible to represent each characteristic material as a layer; for example in this project it was used in four layers.

02 Layers The first layer represents the base material, the second is a finer rust layer, the third has rust edges and the fourth is for the snow. Simple materials generally only have the base layer and small details, in addition the most complex of these details may be mixed with other types of materials with different physical properties. Exploring these details makes your rendering more realistic and visually more interesting.

03 Material and lighting Be sure to create the material with the lighting set up as close as possible to what you will have in the final render, this avoids unpleasant suppression. Colour saturation issues in this case can be helped with the use of an HDRI map. The Blender owned sIBL GUI (Smart IBL) is an external add-on to help you with managing HDRI maps.



04 Stay organised The early creation of a material using the Blender Node Editor with the Cycles render engine should, from the start, always take into account the organisation of the nodes that are inserted. Working this way makes the operation clear and the editing facilitated.

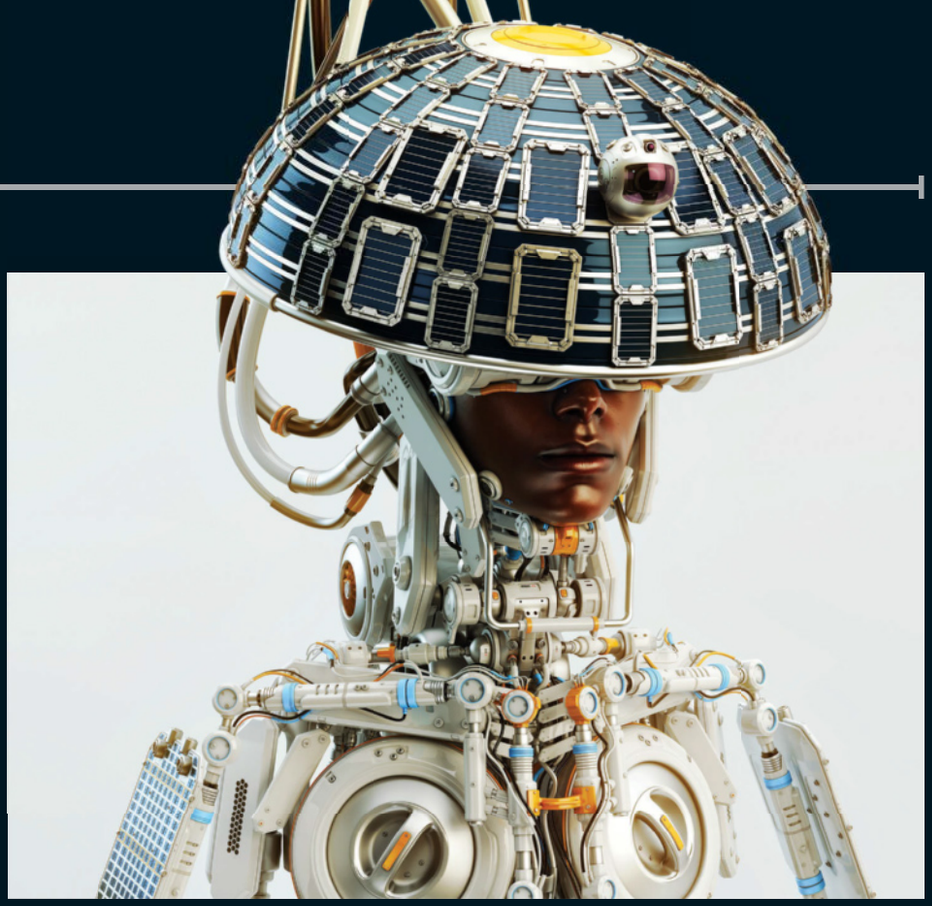
05 Materials and masks The friction marks were made using a Normal map with a Bump node. The next step is the preparation of textures, rust and ice masks. The masks are used for different types of materials and interact among themselves in rendering. There are two main ways of using masks in Blender: using Vertex Colors or external textures – this project utilised both. For the creation of rust on metal edges (for layer 4), I used Vertex Colors in Vertex Paint mode. To merge the snow material with the metal material, I used an ice texture in greyscale that was imported into Blender using the Texture Image node and had a Mix Shader's Factor attribute applied. Organised nodes facilitate the use of the same material in other parts of the scene – for example, the snow material was used on other parts such as the wheels, tarpaulin, truck and ground.

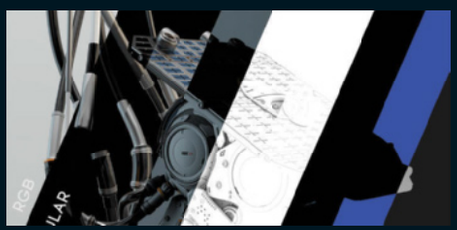
60

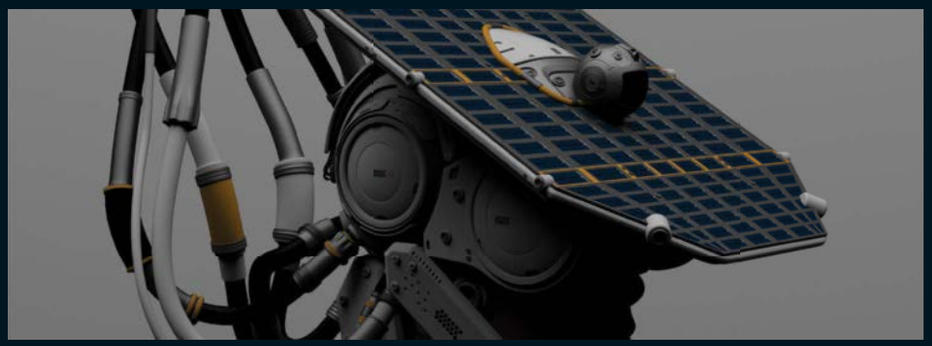
Composite in 3ds Max

VLADISLAV OCIACIA is a 3D concept designer and modeller from Ukraine
bulldozer-vfx.com

Here I will show you how to create stunning visuals in 3ds Max with the help of Photoshop and other quick tools – I will use my Afrosamurai robot as an example. The render took three hours to complete at 3000x3000px. I used V-Ray because it is has a great setup and all the functionality that we need. I used RGB, Refraction, Specular, Reflection, VRayLightSelect, ExtraTex (two versions – one that is lighter and one that is hard light), SSS2, MultiMatteElement and ZDepth. Also, indirect illumination was used, but if you need to render quicker you can go without and later, in Photoshop, you can achieve the effect of indirect illumination with the help of passes you outputted (light select, total light and raw lighting).







01 Render passes Assemble the passes using Photoshop. The RGB pass is the basis for this render. Next comes the Refraction pass with Blending mode set to Screen. Then duplicate the Refraction pass set to Colour Dodge. The Specular pass is set to Colour Dodge and finally a Reflection pass is set to Screen. For all of these passes adjust the Opacity value, but the Reflection pass in particular neds to be set to around 30 per cent.

03 Lighting The VRayLightSelect element can be used to tweak lighting in post. It's a render element to extract the contribution of individual lights. We can use either Screen or Colour Dodge for LightSelect (depending on the work; for this we have used Screen and tweaked Opacity). Usually I use a minimum of three LightSelect passes for each light in the scene. If there are scene light elements then we can output a pass called Self-illumination and use it with Screen, and then blur it a little bit. With the help of a MultiMatteElement pass, which creates a selection of masks based on Multimatte ID or Object ID, cut the image from the background and work on the individual elements of the image to change its colour or texture.

02 Texture mapping Now we will use the ExtraTex render element to apply dirt (with a big radius) using the Multiply option. Then we will use an ExtraTex with a small radius to highlight any details and again use Multiply. As before adjust the Opacity value for these.

04 Depth and compositing To create depth of field we can use After Effects with the help of the Lenscare plugin by Frischluft, which is very powerful. Also there are optical flares made by Video Copilot, (**videocopilot.net**) that could be a great addition for your artwork.

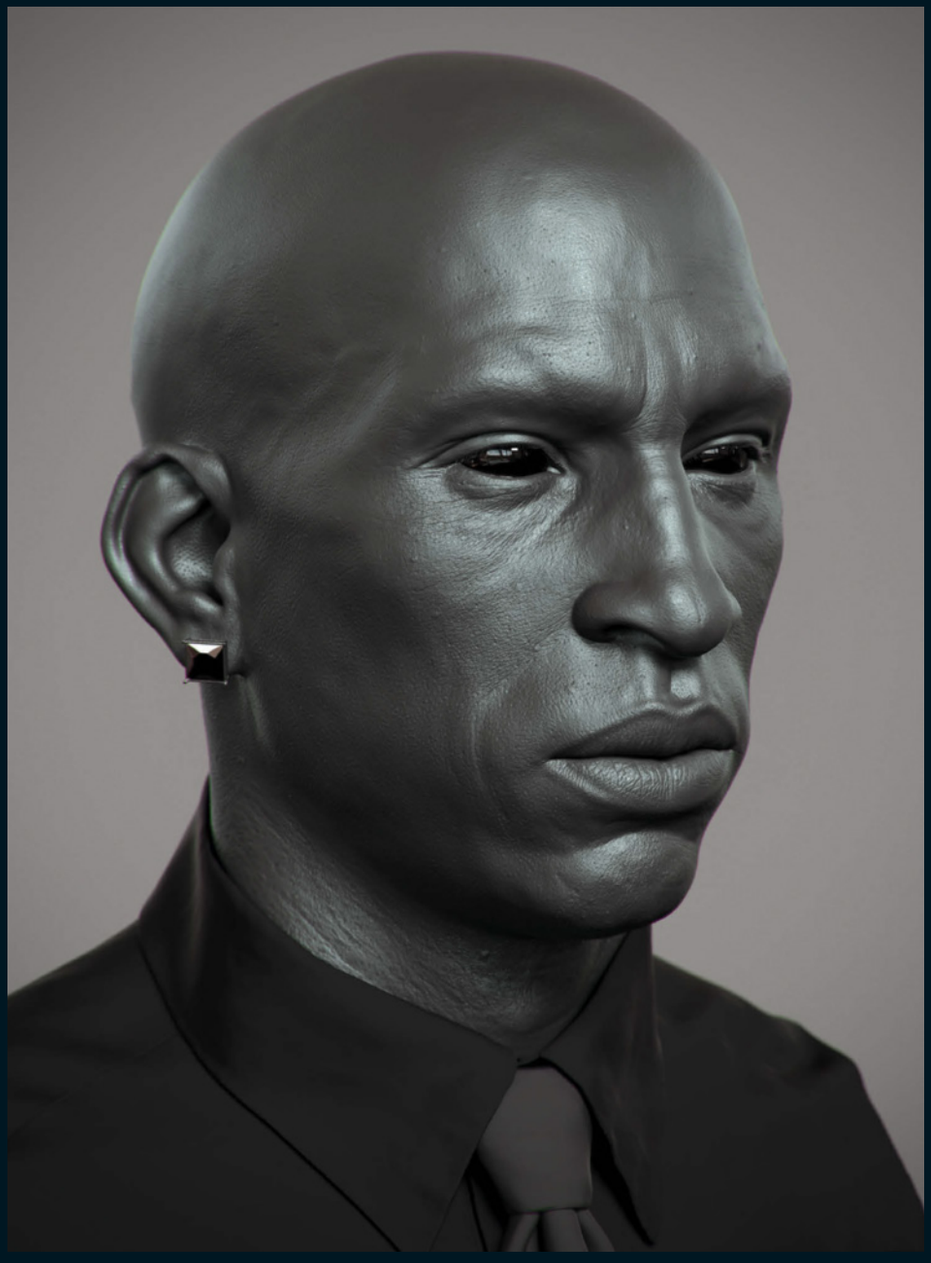
05 Post-production When you get to the stage of doing final tweaks you can use a plugin for all kinds of different colour corrections. I used Red Giant's Magic Bullet Looks (**redgiant.com**), and this can be used in both Photoshop and After Effects.

Build tertiary details with hi-res displacement scans using ZBrush and MARI

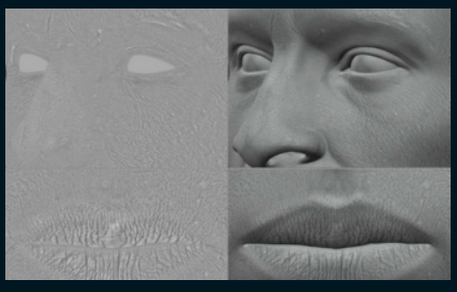
JONAS SKOOG is lead character artist at Bläck Studios, working mostly with cinematics and videogame trailers
jonasskoog.com

Creating fine details on your models can be a tricky process. Which way should the different pores stretch and what types are there? Maybe you have a few alphas created from photo references or perhaps you paint them using various brushes in your favourite sculpting app? These techniques can indeed yield good results but it takes a lot of practice and understanding of the human skin to get there. What if you could just paint those details like you would an ordinary colour map – getting all the natural directions and types for free?

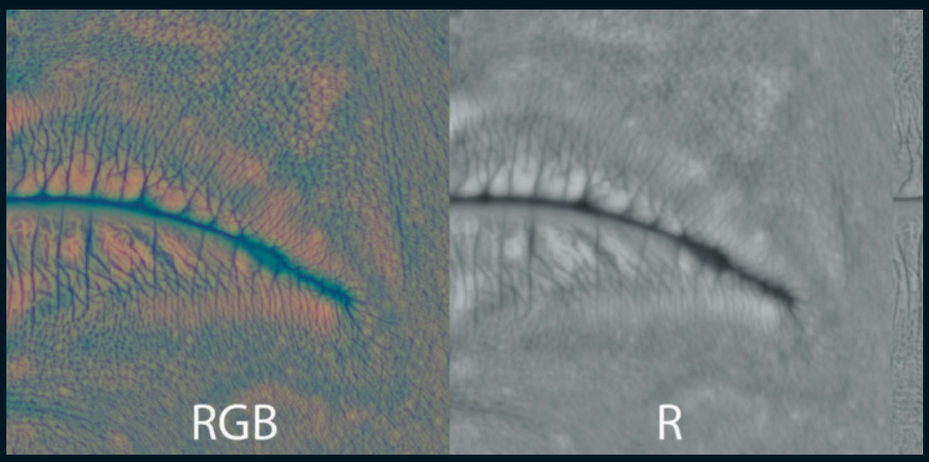
In this tutorial I will cover how to quickly create tertiary details such as pores and fine wrinkles on a humanoid model using scanned displacement maps. The maps I used were created by a company called Texturingxyz (**texturing.xyz**) and will be released to the public very soon.



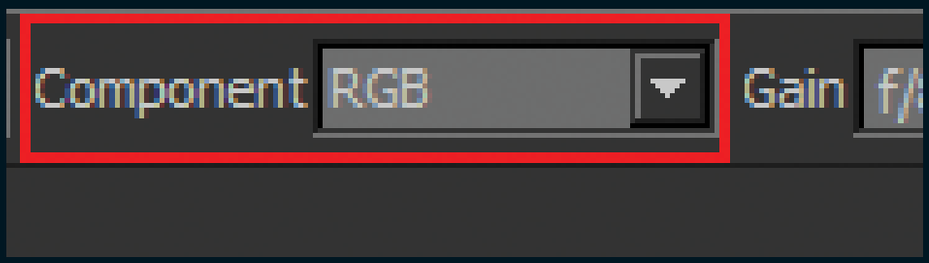
01 The model Sculpt the mesh in ZBrush to a decent level of detail by blocking in the major forms of the head. Use the Move and Clay Tubes brushes to get all parts like nose, mouth and eyes into place. Then move to secondary details such as big folds and crevices using Dam_Standard and Standard. Since this is a fictional character there are no concerns for any likeness. When happy with the result, ensure the model has proper topology and UVs. I usually project my sculpt onto a pre-existing basemesh which holds good UVs to save precious time and make room for the fun stuff. To do this, import the basemesh into ZBrush, align it to the sculpt with Move so they match in shape and subdivide it to roughly the same resolution as the sculpt. ProjectAll, found under SubTool>Project, is used to transfer the details over to the subdivided basemesh. This model is exported to MARI where I load up displacement scans in the Image Manager and paint them on like a Colour map using the Paint Through brush. Check your UV size before painting and choose a resolution that can hold all the details you are about to paint. The higher the resolution, the more details it can hold.



02 Displacement scan These Displacement scans actually consist of three maps in one, spread across all three RGB channels. Combined, all you see is just a mix of all three channels in a brown-green tone, but separated you get very different depths of detail. This gives me the ability to paint secondary details, tertiary details and microsurfaces simultaneously.

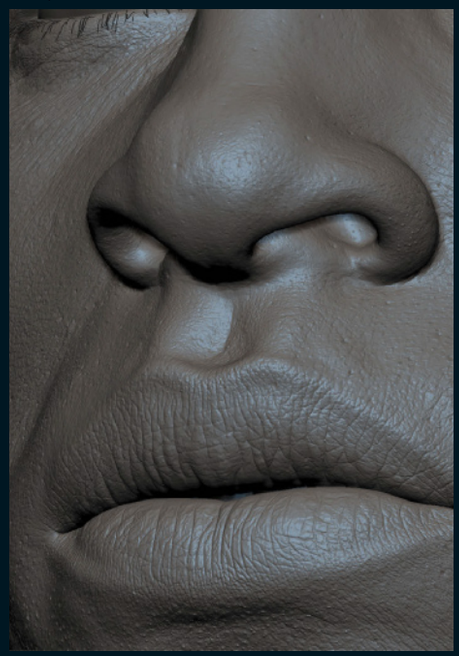


03 Component menu Instead of painting unintuitive brown-green maps to see which channel is doing what, in MARI you can easily switch between them in the RGB component display and finish the work in your preferred channel view. When you are happy with the results it is time to export the new Displacement map and separate the channels in Photoshop to give you the three different maps you just painted. You could use the map as it is in ZBrush, but you will lose the control to fine-tune. When you have finished with everything, just import them into ZBrush.



04 Final work in MARI There are a couple of different ways to apply the details onto your model, but this is how I do it. I have two workflows that I alternate between depending on the effect that I want to achieve in the end. None is better than the other and they work best in combination with each other to give rich depth and detail to your skin. The first one is the simplest and is also the most straightforward. Load the map into the Displacement Map menu, set the parameters to your liking and click Apply. A low Intensity number here is preferred – probably around a value of 0.01 to 0.03 so as to not overcrank the result. Make sure to enable the mode to see how the map displaces the mesh. The second workflow is a little trickier than the first. This time we will load the Displacement map into the Texture Map menu to set it as an albedo for your model. Now you can mask the details by going to Masking>Mask by Color>Mask by Intensity. If you now apply Deformation/Inflate, the unmasked details will be pushed out to create a similar effect to the previous workflow. Be careful with using Inflate since it can easily bloat your mesh. Both of these techniques will provide you with roughly the same result. Pick the one that you like the most or have a go at combining them like I did. As long as you are satisfied with the result, how you get there doesn't matter. If everything has gone well you should now be on your way to a very realistic skin result.

05 ZBrush details Always work in layers to be able to step back if needed, and this is especially important if a client is giving you feedback or changing their mind about things. You can also play with the results with ease if you make use of Morph Targets along with the sculpting process. Just save a Morph before you apply any tricky details and shave off the unwanted ones using the Morph brush.



06 Final work in ZBrush Now that you have the techniques pinned down you can experiment with the different Displacement maps to create that extra depth of realism to your model's skin. Use the Secondary Detail Disp for larger details like pimples and uneven skin and the other two for the fine pores and wrinkles down to the finest microstructure. Good luck!

Make seamless blend materials for hard surfaces in Maya

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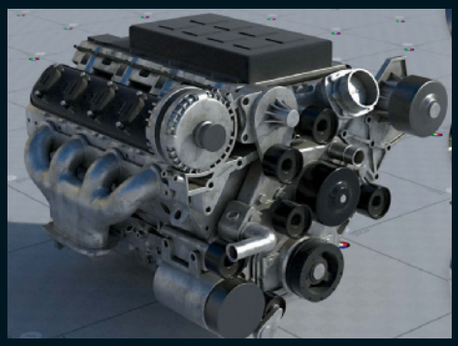
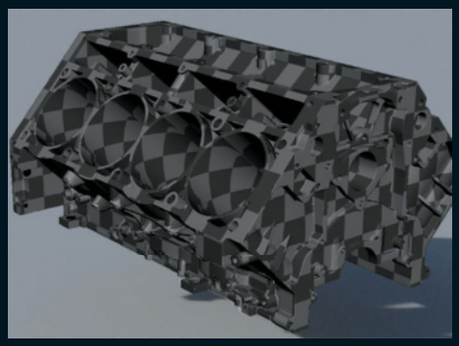
are 3D artists at OutpostVFX
outpostvfx.com

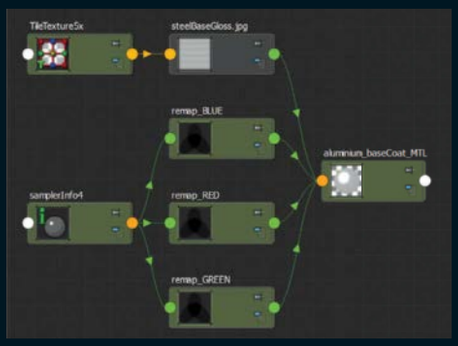
In this tutorial we'll give you an overview of creating seamless blend materials in Maya. These are extremely powerful as you can reuse the same material for multiple objects but still end up with differences for each object based on its UVs. For example, we used this fairly simple grunge metal shader for all of the metalic parts of this engine instead of hand-texturing every piece. This was the workflow we used for the engine in our short film 'The Workshop'.



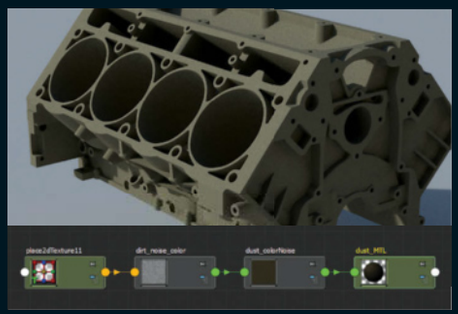
01 Analyse real objects When using this workflow the most important thing is to simplify. Analyse the real object and break it down into each type of material. In this case, a grunge metallic shader was broken down into three main materials: base metal, main grunge (all over the metal) and dust (in occluded areas). Another very important step is to gather your textures and make sure they are all seamless so you can tile them with the place2dTexture node in Maya.



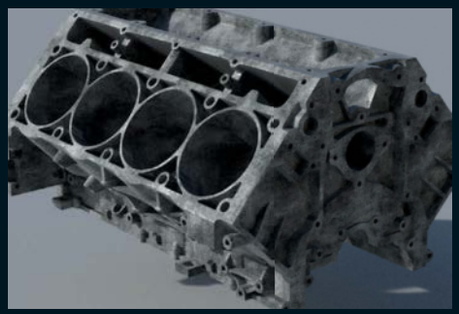
02 Check the UVs Before going on to the next step and creating the shader, you should check on the UVs of your model. Making sure that all of the UVs are uniform with hidden seams is always important when you are adding tileable textures, as UVs will create noticeable lines in your model. You can check the scale of your UV islands using a checker texture – making sure the checker is uniform will result in less texture resolution changes occurring.



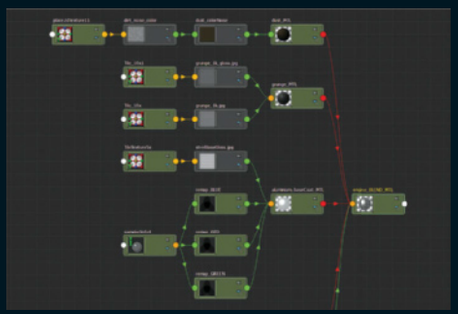
03 Base material Now we create the base material, in this case it's a simple aluminium/steel metal. As we will be layering extra materials on top, we need to create a base material with a very simple tileable gloss texture to break up the specular. The remap blue, red, green nodes are custom fresnel curves connected to the specular colour of the material to create a more realistic metal. You can find out more about fresnels by Googling "custom fresnel curves in Maya".



04 Add noise to materials Next we will create the dust material. For this you can just use a simple material with no specular and a flat brown colour in the diffuse. In our case we wanted to add a very subtle variation to it so we started with a noise and pumped up the frequency for sand-like noise. We then pumped it into a layered texture and created a flat brown colour value which was multiplied by the noise to create the variation.



05 Grunge material For the final material we introduce the main grunge/grime. We found a nice seamless grunge texture from which we created the diffuse and the gloss. They were both tiled ten times in the place2dTexture node. At this stage it might become apparent that the texture is tiled on your model, however if your blend mask breaks up the material enough on your final shader then this shouldn't lead to any problems.



06 Material blending For the final stage, the main thing you need to worry about is how you are going to blend between the materials that you created. In this example, we want the dust material to show up in occluded areas, therefore we used an inverted AO mask to mask between the dust and the base metal. For the grunge, we used another modified grunge seamless texture and tiled it about ten times.

24/7 support

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The Pipeline

Expert advice from industry professionals, taking you from concept to completion
All tutorial files can be downloaded from: **filesilo.co.uk/3dartist**

"We will take advantage of Unity 5's fully PBR HDR pipeline, achieving gorgeous and predictable results"

Build gorgeous sci-fi environments in Unity 5

PAMELA is a sci-fi horror game set in a fallen utopian city. Find out here how to re-create scenes from this exciting new release

Over the next 17 steps we'll be going over the design, workflows and final composition techniques that we're using to bring *PAMELA* to life in Unity 5. Our design process is focused on crafting believable architectural spaces in which gameplay will unfold; we utilise both real-world references and concept art to keep the environment relatable while still attaining a unique style. We will take advantage of Unity 5's fully PBR HDR pipeline, achieving gorgeous and predictable results from texture authoring all the way to material creation in the engine. We will also walk through the process of setting up dynamic GI and reflections in your scenes – these tools are crucial for maintaining a cohesive look in your environments.

Lastly, we'll go over some tips on utilising Unity's post-processing tool, Image Effects, and how to add extra depth and artistry to your final image. Keep in mind that each of these topics could span a tutorial or two in and of themselves – there's always more to learn!

ADAM SIMONAR
PAMELA – coming soon to PC, 2015

Software

Unity 5, 3ds Max, Photoshop, Substance Designer (optional), Substance Painter (optional)

Learn how to

- Design sci-fi environments
- Create PBR content for Unity
- Set up dynamic lighting and global illumination
- Integrate HDR reflections into your scene
- Apply post-processing image effects to your camera
- Use assets from the Unity Asset Store to enhance your workflow

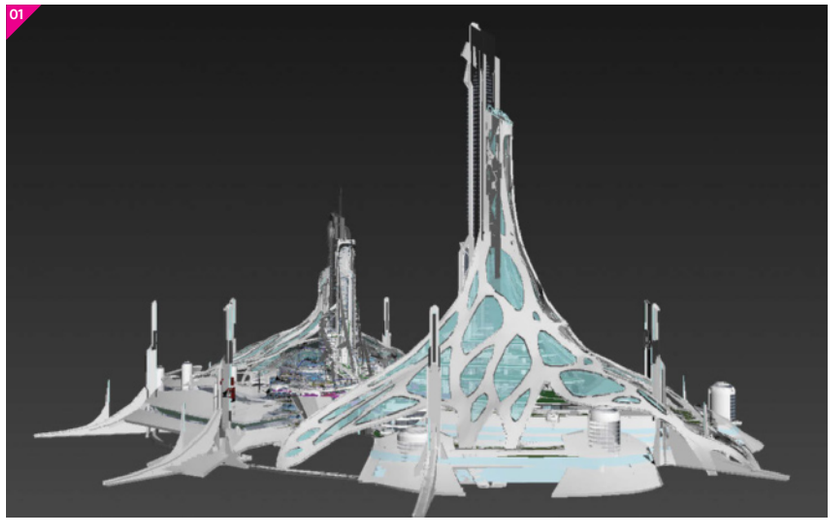
Concept

PAMELA takes place in a fallen utopian city. We first created an environment that reflected the clean, peaceful aesthetic of such an area, then injected bits of disrepair to give players a sense of 'wrongness' as they explored the levels.

YOUR FREE DOWNLOADS
from **filesilo.co.uk/3dartist**
- Tutorial screenshots

01 Start with the large scale

Eden, the city in which *PAMELA* takes place, presented an immediately steep design challenge. When starting any design process, it is always best to go from the general to the specific. In this case, we began designing the overall architecture of the city, establishing the style at a very simple level. At this point, focusing entirely on shapes was more effective than worrying about texture detail and rendering quality. This way, we developed our language of clean lines, which can be embellished on later in the project.

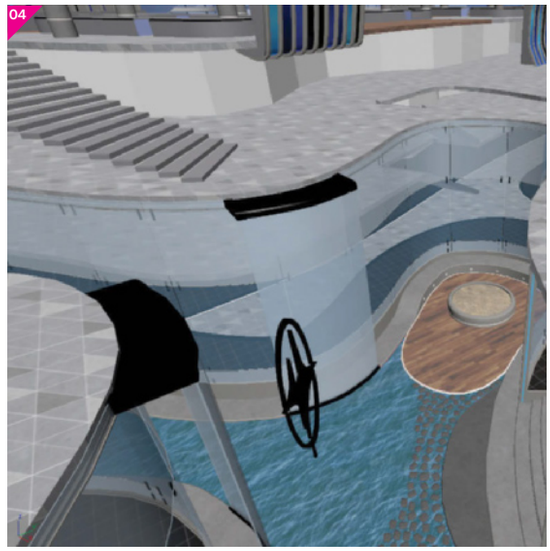


02 Refine the look and mood

Once we had developed enough of the large-scale architecture to be confident in the style, we produced mood paintings to showcase the design in the context. Even though the design itself is still highly subject to change at this point, these pieces can help us to set visual goals for the project as we continue to design and build.

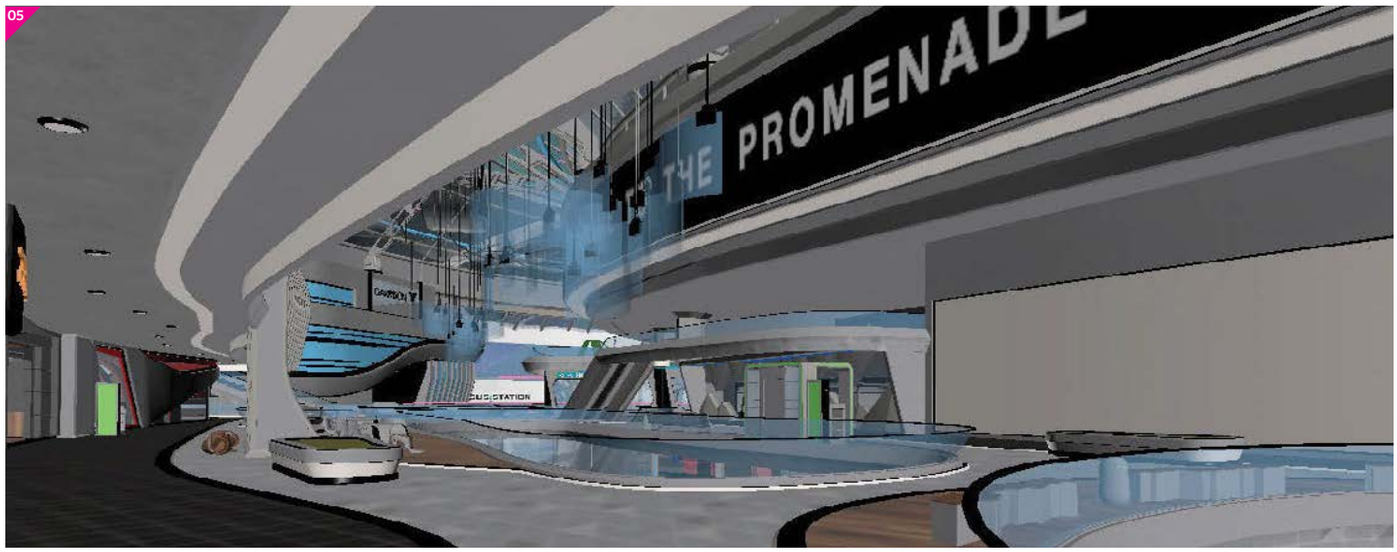
03 Block out key gameplay spaces

Once you're satisfied with the large-scale architecture, move onto blockouts and secondary detail passes on small areas within the level. These can be paintovers, or rough 3D models – whatever helps you develop the space best. In doing this, you'll be simultaneously testing your earlier work for flow, and further developing the scene's visuals. After blocking out these key spaces, you can begin filling in areas between them to start tying the level together. Don't be afraid to make significant changes at this point; it's much easier to make alterations now than it will be soon!



04 Build up geometry detail

After blocking out the basic flow, you can continue to build up detail. At this point, we started working with basic tiling textures, without going too crazy with details and atlases yet. For our art style, much of the final look comes down to the silhouettes and shapes, so we made sure to avoid over-texturing at this point.



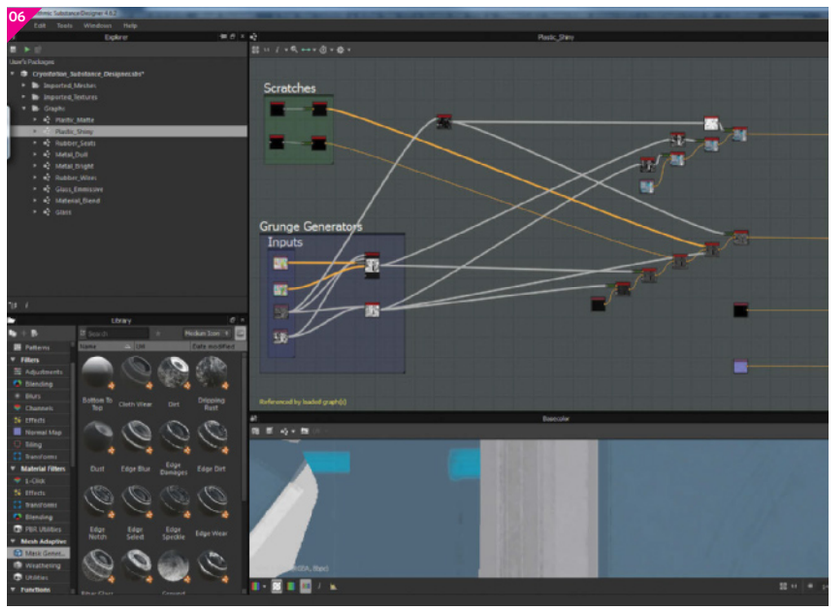
05 Polish and export the scene After you've polished up the geometry and UVs in your scene, it's time to export the meshes for use in Unity. Depending on the structure of your level, it is often best to export geometry in separate chunks rather than all together. Due to the nature of our environment, we're not able to 'modularise' very much, but it is a good idea when possible. Export your chunks as FBX files; the default FBX settings will work fine in most circumstances.

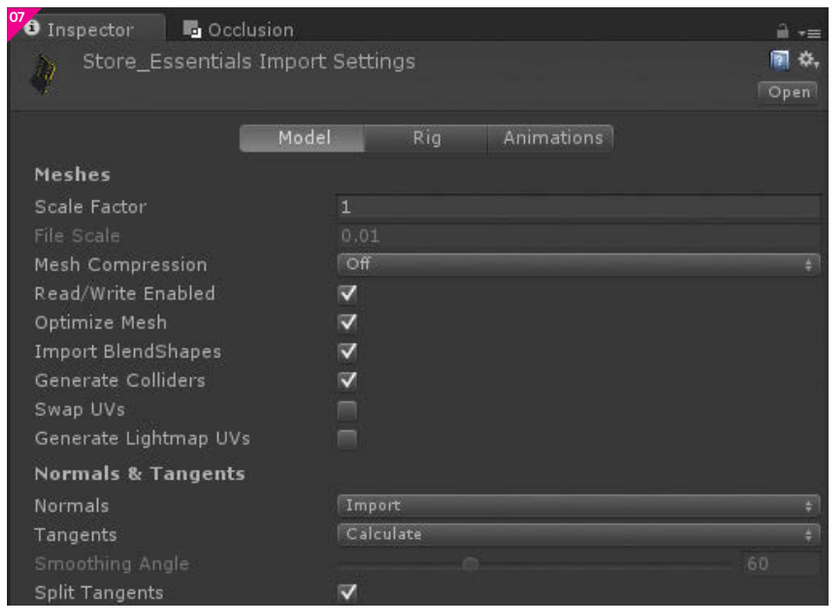
06 Generate PBR textures with Substance Substance Designer is a great way to improve your workflow when generating PBR content. Since any given material will require at least four or five texture maps (Base colour, Metallic, Roughness, Occlusion, Normal), Substance Designer makes it easy to co-ordinate your work across these outputs. You can achieve a great deal of depth in your materials by combining different input maps and blending them across different channels. Once you're happy with your material, export the maps as TGA files.

07 Import your meshes Unity 5 has a very straightforward import process for FBX files; simply create a Meshes folder (for organisation) and drag your files into it. If you have been modelling in real-world scale, your mesh will automatically be scaled correctly inside of Unity. It may also be helpful to toggle Generate Colliders on, so you can walk around in the space. Just remember that you should usually be creating separate collision meshes that have been optimised and cut down for this purpose.

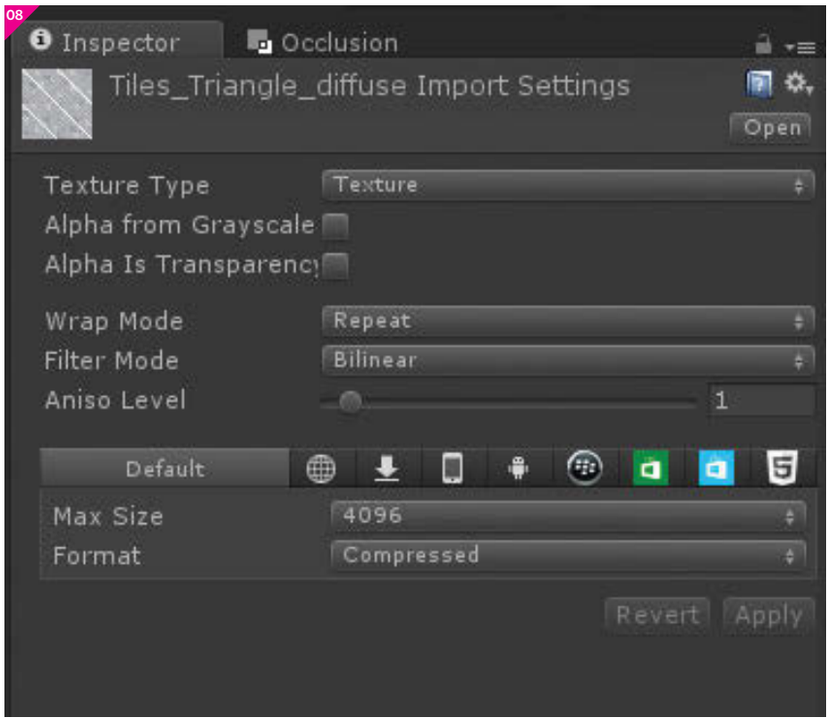
Build up detail in stages

Be careful to avoid over-detailing on a small area in your level, early on in the process. It generally helps to have a rough idea of how far you will go with each detail pass on your level; for example, establishing rough geometry limits and texturing guidelines can make iteration much easier while you're still early in the design process. It can also be helpful to do small case studies within your level, taking a chunk and bringing it up to a final quality level. This gives you a clear benchmark to aim for, just keep in mind not to jump to this stage too early.

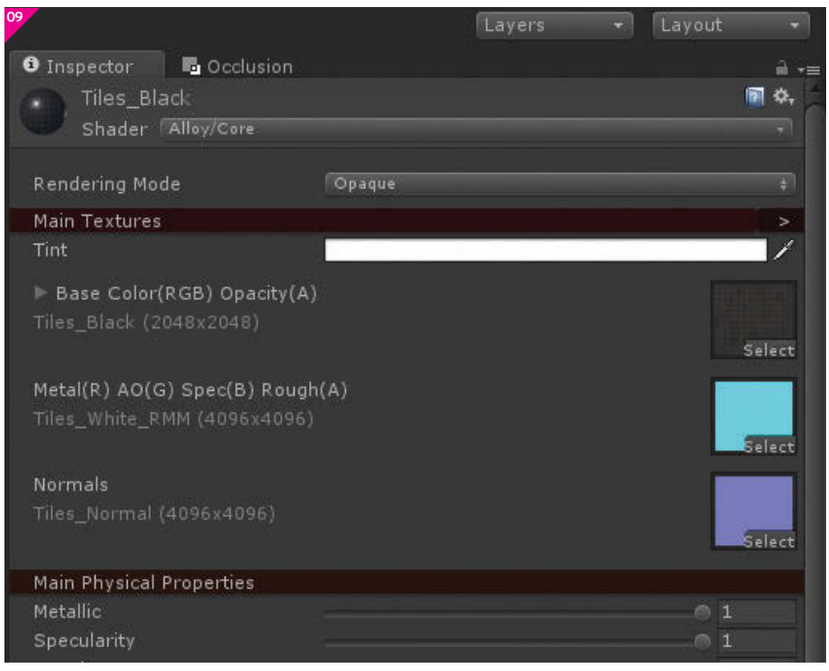


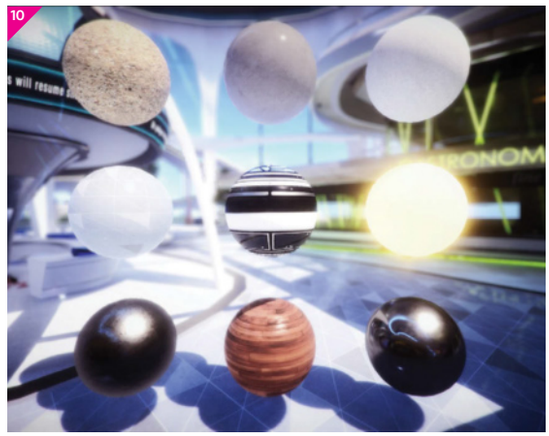


08 Import your textures As with models, importing textures into Unity is very straightforward; simply create a Textures folder in your project and drag them in. By default, all textures will be set to 2048px resolution, which can be increased up to 8192px if you require it. Most textures can have their Texture Type set to Texture, but for Normal maps this will have to be changed to Normal Map for the texture to function correctly.

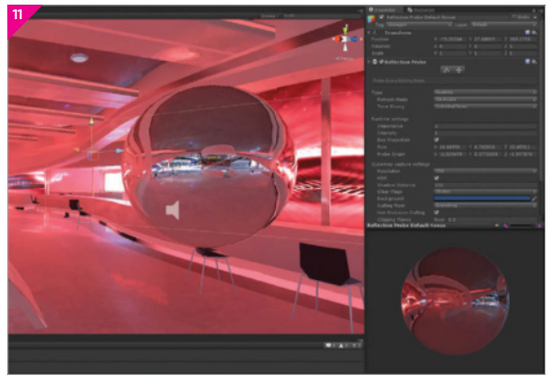


09 Create your materials Once you've imported your meshes, you should see a Materials folder next to your FBX file in Unity. You can use these as starting points, or make your own folder for them elsewhere. To create a new material, right-click in your Project Panel and click Create>Material. In this example, we're using an Alloy Physically Based Shader framework from the Unity Asset Store, which utilises a packed map containing Metalness, AO, Spec and Roughness in a single map, among other great features. If you're using the Unity Standard shader, these maps would be input separately into the material.





10 Experiment with material types It's helpful to line up your various materials as you're setting them up in Unity. This gives you a good idea of how well they work together in the scene, and serves as a good lighting calibration tool. Since we're working with PBR, it's important to note the differences in that ways that metals, non-metals, and hybrid materials receive light. For example, sand is extremely diffuse, whereas chrome is almost mirror-like and receives negligible direct light; these are obvious observations, but it's important to keep them in mind as we move on to the next steps.

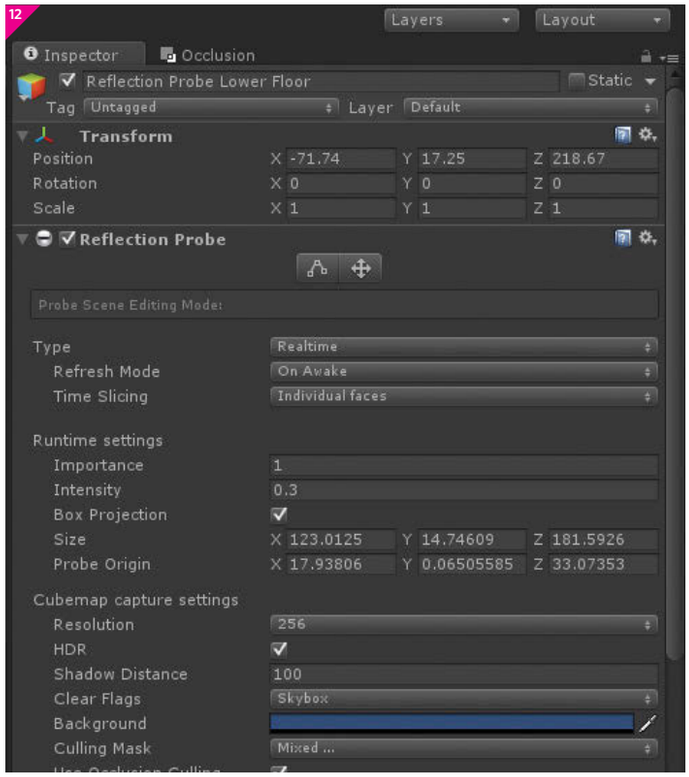


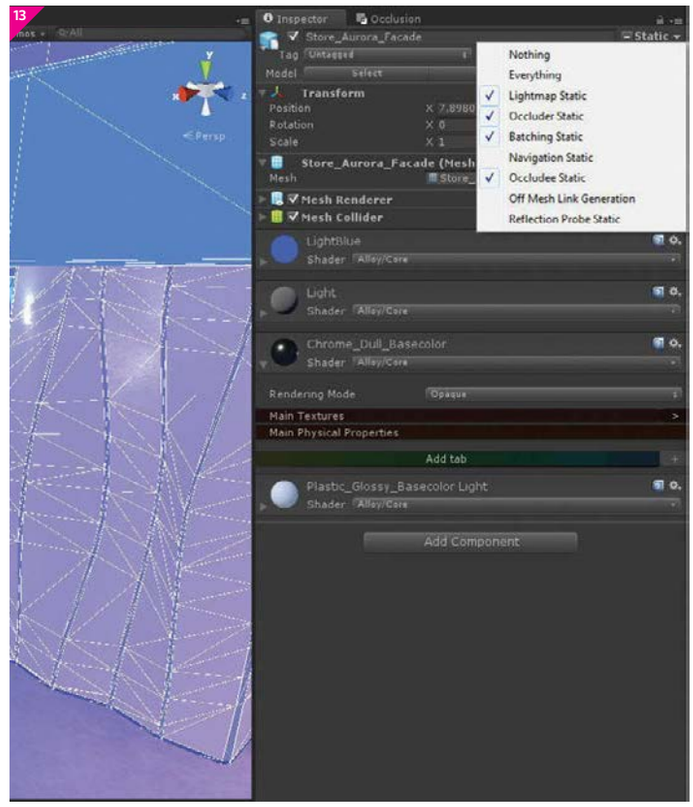
11 Add Reflection Probes Reflection Probes are objects that you place into your scene, which create cubemapped reflections for objects near them. These are crucial in adding extra depth and dynamism to your scenes, and can be easily placed throughout your level as needed. You can create Probes by right-clicking in your Hierarchy panel, and clicking Create>Light>Reflection Probe. You will want to size the Probe to roughly match the size of the room or area that it is located in; this will increase reflection accuracy.

The Asset Store is your friend

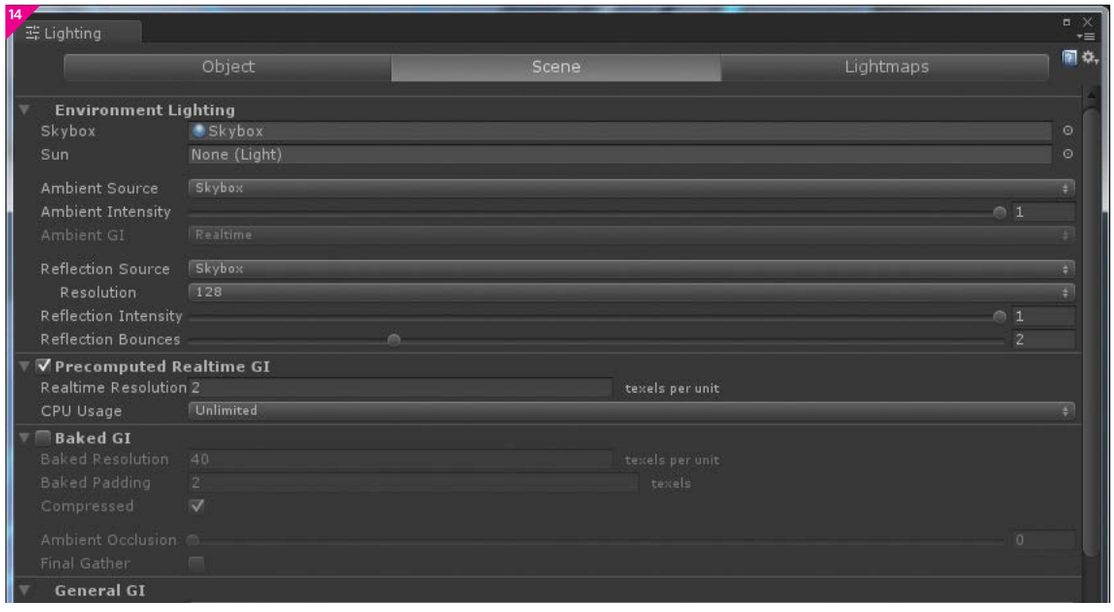
Throughout this article, a few third-party assets that we use from the Unity Asset Store are mentioned. We highly recommend investing in a few popular visual enhancement assets, like Alloy Physically Based Shading, Amplify Color, Natural Bloom and Dirty Lens. These are only a few examples and they can give you more flexibility in achieving rich, high-end visuals. Aside from visual assets, other assets can help you get started in other areas of game development, go check it out!

12 Configure the Probes Once you've created a Probe, it is important to set it up correctly. By default, Probes are set to Realtime and their Refresh Mode is On Awake, meaning they will render once you hit play but will not update if anything is changed in play mode. You will likely want to check Box Projection; this will help your reflections follow the camera's angle more accurately, and enhance the believability of the reflection. You also have options for resolution; usually lower values work just fine and save memory.





13 Set up GI static objects Unity 5 features real-time GI powered by Enlighten. The system is very powerful, but you must mark which objects will be static in the GI calculations. This is done by selecting the object, then clicking the Static dropdown, and choosing Lightmap Static. Keep in mind that the more objects you set as static, the longer your lightmapping process will take and the higher your performance cost will be.

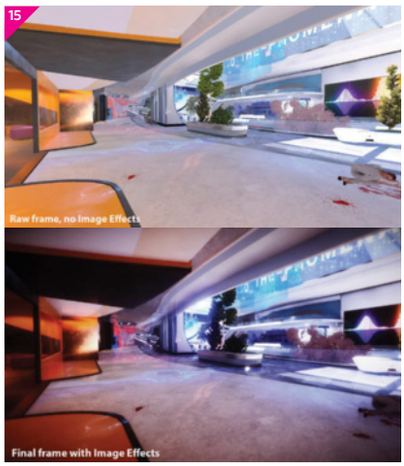


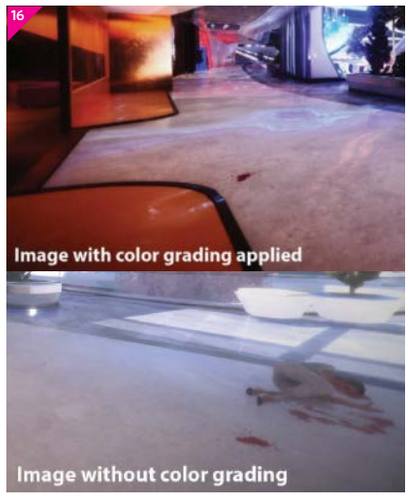
14 Configure lighting parameters Once you have set your desired objects as Lightmap Static, you will be able to pre-compute dynamic GI in your scene. Check the Auto box at the bottom of the lighting window, and Unity will automatically begin calculating your scene's GI. Once this process is complete, you'll be able to move lights around, change their intensity, play with emissive materials and the bounced lighting in your scene will update in real time. You can achieve great day-night cycles this way, and your scene's real-time lighting will be much softer and realistic overall, at a slight performance cost.

Make use of Light Probes

Light Probes, like Reflection Probes, are objects that can be placed into your scene to sample your environment. They will help to approximate global illumination onto dynamic objects in your scene, and do wonders to ground these objects. Note that dynamic objects do not affect the GI, but can still receive this lighting. We created an in-house tool that helped us to place these more easily, but the amount and layout of the Probes that you need will depend on your individual scene.

15 Add Image Effects Image Effects, Unity's post-processing tool, has a profound impact on the mood and quality of your final image. They should ideally be added to your camera once you have completed your initial scene setup, as we've done here, so you aren't relying on them as a crutch early on. Unity ships with a broad selection of effects; Bloom, SSAO, Vignette and Color Correction are some that we consider must-haves when aiming for a high-end, professional look. You'll want to import the Standard Assets package from Unity, found on the Asset Store, which contains all of these effects and more to play with. Be careful, though, as adding too many post effects can hurt your frame rate.



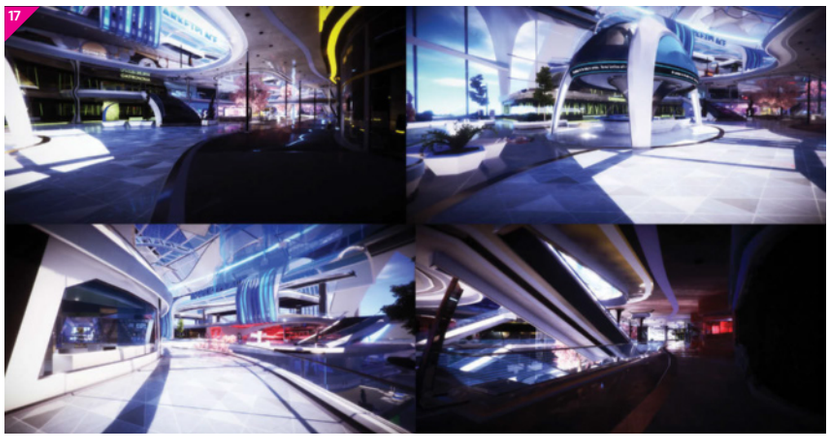


16 Colour grading Correction and grading in terms of colour is an exceedingly important step in your effects chain, and is very inexpensive performance-wise. With this tool, you're able to colour correct your image in Photoshop, After Effects or any other image editing tool, and replicate the results inside of Unity in real time. Just keep in mind that it is only able to replicate fullscreen, pixel-based colour corrections, not painted/unique effects. Unity ships with the Color Correction LUT Image Effect which you can use to achieve this; alternatively, the Amplify Color plugin has a great workflow that makes the process even easier.

17 Final tweaks and testing As you're finalising post-processing, explore your level to test the visuals in different areas. If you spend all your time colour correcting a dark area and calibrating your values to that space, it is likely that these values will not work in average conditions. That being said, test your effects in extreme conditions that may arise in the game; sometimes unpredictable results can occur in fringe cases. The final look is always the result of iteration, and usually comes only after hundreds of minute tweaks. Don't rush yourself!

The Unity community

One of the best parts about working with Unity is the amazing community surrounding it. If you're ever stuck on a problem, chances are someone else has also dealt with it at some point, and often you'll find answers on the Unity Forums or elsewhere. You'll also find helpful tips and tutorials that can help you get more familiar with the various features Unity provides.

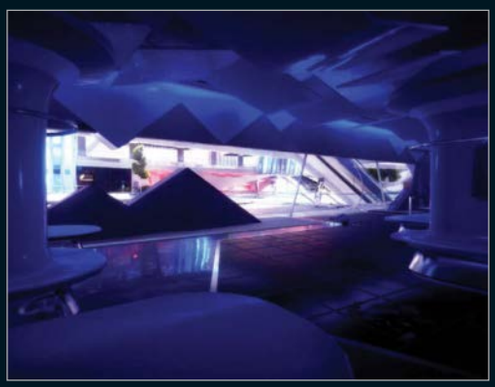


Showcase

Adam Simonar

Adam is the studio director and level designer at NVYVE Studios. With a background in architectural design, he is a self-taught CG artist and Unity developer. Along with the team, he's currently working on *PAMELA*, a sci-fi survival horror game for PC. Here are a few images from the game.

***PAMELA - Bar Area*, Unity, 3ds Max, Photoshop, Substance Designer (2015)**
A bar, found within a mall area in *PAMELA*.



***PAMELA - Clothing Store*, Unity, 3ds Max, Photoshop, Substance Designer, (2015)** A view from inside a clothing store, looking out towards the bright common space.

***PAMELA - Mall Walkway*, Unity, 3ds Max, Photoshop, Substance Designer, (2015)**
One of the many walkways found in *PAMELA*'s shopping area that tie the stores together.

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NICOLAS DELILLE
Umbonia Crassicornis, 2015

Software
ZBrush, Cinema 4D, V-Ray, Photoshop

Learn how to
- Create an insect from scratch in ZBrush
- Use the basic features of ZBrush (DynaMesh, ZRemesher, maps)
- Export your final mesh from ZBrush to Cinema 4D
- Set up a V-Ray scene inside Cinema 4D
- Create realistic lighting with HDRI and area lights
- Integrate a 3D rendering inside a 2D picture with Photoshop

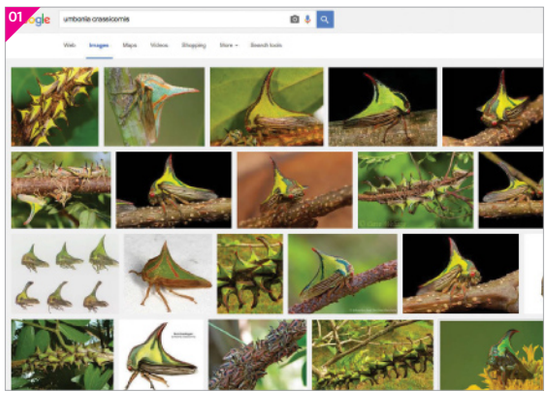
Concept
Our starting point is to make a tiny insect called Umbonia crassicornis. Its atypical shape and colour makes it a perfect subject for a wildlife tutorial

YOUR FREE DOWNLOADS
from **filesilo.co.uk/3dartist**
- Tutorial screenshots

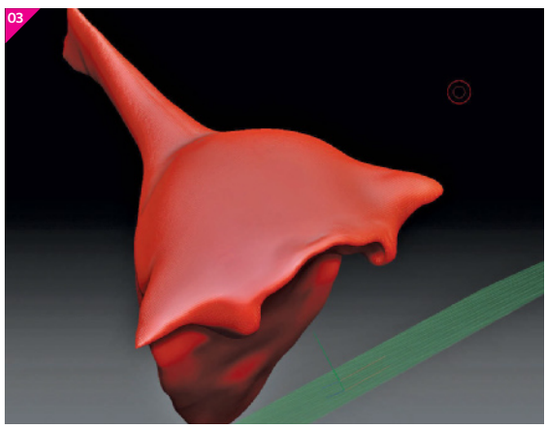
Achieve photoreal wildlife renders

Discover how to use ZBrush and Cinema 4D to create a stylised insect integrated into a forest scene

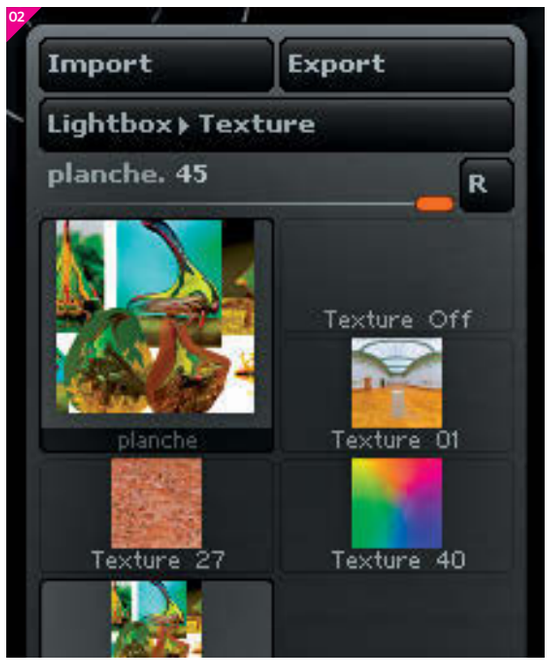
In this tutorial, we will see how we can manage to produce a photorealistic wildlife picture with Cinema 4D, ZBrush and Photoshop. We will go deep inside ZBrush to show you what you need to know to produce an insect full of details quickly and efficiently, with the help of essentials tools such as DynaMesh and ZRemesher. Then we will see learn how to export your model, light it, and set up a scene with V-Ray and HDRIs. And finally, we will learn how to keep all the details after finishing with ZBrush, and to enhance them inside Cinema 4D and then later inside Photoshop.



01 Gather references Any project based on a real insect deserves some references as a starting point. You can use Google and some stocks photo websites like Corbis, Getty or Fotolia to get some good references. They have always good subjects with good lights, so that helps a lot. Try to find anatomical drawings of the insect as well. And best of all, you will have the same insect in several views.



03 The power of DynaMesh Now that we have all the views needed, we can start to sculpt. With a low opacity inside Spotlight, we can start to build the overall shape of the typical helmet of the Umbonia with a low DynaMesh sphere using the Standard, Clay and Move brushes. For this we will use the Symmetrical tool by clicking X and playing around. Keep the DynaMesh density low for now.



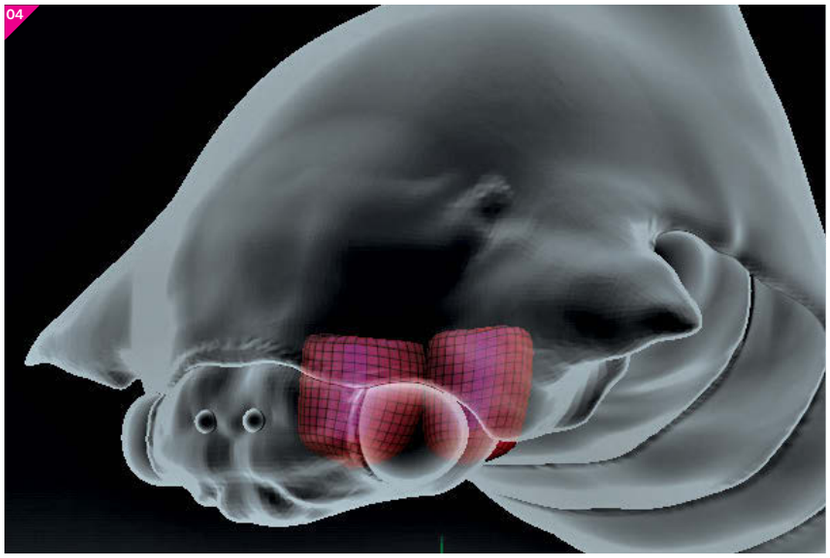
02 Spotlight We have some references so we can now load them inside Spotlight. Click on the Texture menu, import your references, and then for each of them click the + button and your picture will load with Spotlight. You can then decrease the opacity and start to work by clicking Z. If you want to come back to Spotlight, click Z again. You can collate several of these images together inside only one image to avoid having too many images inside Spotlight.

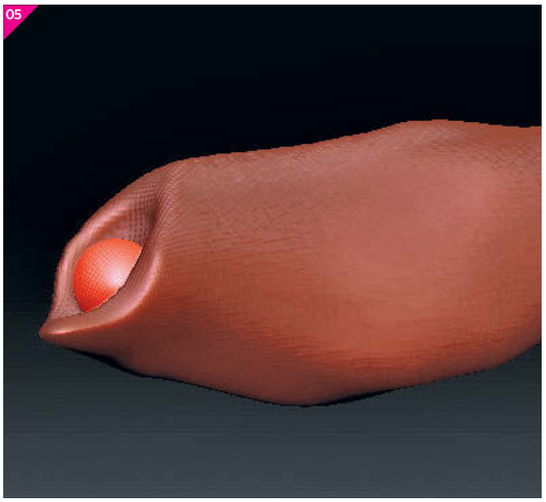
Low density is the key
Why a low DynaMesh? Because it's a crucial point. With a low DynaMesh, you have the freedom to change the shape very easily. It will be way harder and will take longer to do any changes after several steps. My advice is that you should compare your sculpt with several pictures and change the parts that don't seem okay right now. If you have any doubts, make some changes or wait one day and look at it again. For example, I changed the helmet several times during this tutorial.

The composition

Many guides will tell you how to create a nice composition. I would highly recommend you always keep in mind that for wildlife, and insects in particular, that close-ups are a good idea and look natural. Try to make it as close to your subject as you can to show the level of detail you've created and perfectly highlight all of the work you've done so far.

> We can use the Ghost mode to keep the shapes around us and to work precisely



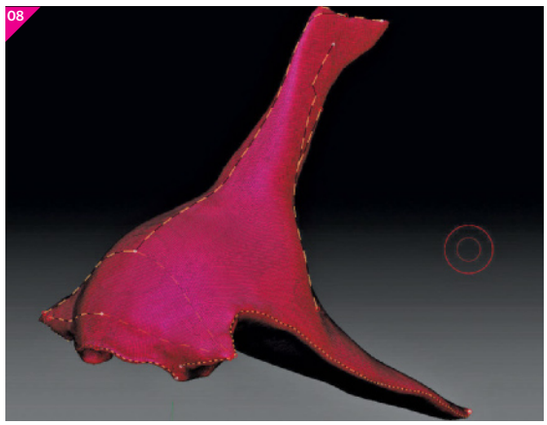


04 Cut your insect into parts The helmet is the key element of this insect. We can use the Move tool and stick to our photo references to achieve the same shape. Once we have done the helmet at low resolution, the rest will flow. We can now start to make the eyes with the other element: we can add two simple spheres for the eyes (add one, put it in the right position, duplicate it and mirror it for the left). We can add another sphere to create the abdomen and one leg, and this will help us to have an overall view before starting to go into details. We can use the Ghost mode to keep the shapes around us and work precisely.

05 DynaMesh – essential Not only does DynaMesh help you to keep a good and flexible resolution, it also has some Insert brushes that are very handy. We can use them to make the legs easier. With the Insert Cylinder and/or the Insert Sphere, we can work on the overall shape quickly. Once we are happy, we can Ctrl/Cmd+click once (not twice or all the elements inserted will merge together) and split them (using Subtool>Split>Groups split). Every element inserted will have its own polygroup. Easy!

06 From low resolution to high resolution We have started our DynaMesh meshes with a low resolution (around 64). Now it's time to increase the density a little bit more, and start to make more complex forms – but nothing too extraordinary yet. We will use the ZRemesher to simplify our mesh. Stick to what it should look like.

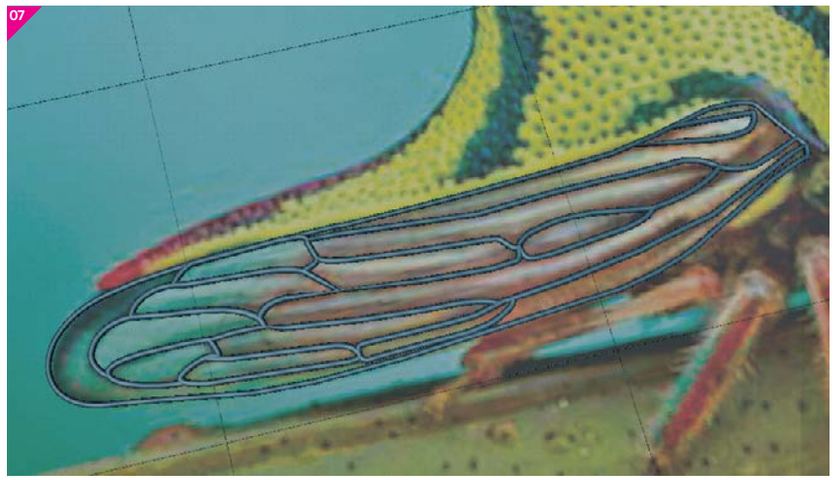
> "Draw some ZRemesher guidelines so that the polygons flow in the right direction"



08 ZRemesher Now that all of the parts of the insect are done, we can use the ZRemesher. It will change the topology and reduce the amount of polygons. We can use the standard setup of ZRemesher for this. For the helmet, we would recommend that you draw some ZRemesher guidelines so that the polygons flow in the right direction. This will be the most visible part of our insect, so the topology has to be good.

Realistic lighting

Once again, take a look at real-life lighting and how the natural light can affect a closed space. When creating soft lighting in an interior you need to first analyse your scene in order to predict how the light will be distributed and where you'll need support lights to brighten up shadow areas.



07 The wings To make the wings, we will need to draw the stroke of one wing and the inner parts in Cinema 4D with the help of references. We can merge splines together, which will be crucial to the success for the inner parts. To do so, we can merge them with the Spline Union feature of version R17 (or with the Pathfinder in Illustrator). We can then use the Sweep tool with a low circle radius to add volume to the inner parts and make them editable. The spline of the stroke of the wings will be inside a loft generator, and we can edit it too. We now have two objects. For each of these, select it, and all its children, and choose 'Connects objects + Delete'. Export the file as an OBJ and import it into ZBrush for your insect.

09 Retopology and UVs All of the meshes of the insect are properly retopologised. We will now use the UV Master and click Unwrap for each piece. If you really want better control over UVs, we suggest you send your mesh with GoZ inside Bodypaint to tweak your UV. You can then stretch your UV to have more surface for your maps.

10 Details and Polypainting Now we can add the finest details to our mesh with higher subdivisions. A high subdivision is required for your displacement and Polypainting maps. We usually stay with the Standard brush and with the standard alphas. You can find additional skin textures on the internet that can help, though. We will use a low spray with different alphas and test them. We will need noise and bump on the insect's surface to make it realistic. For the colour, you can use either Spotlight or a brush with colour. For this example, we can draw with colours following some references. For the holes on the helmet we used a black dot texture that was loaded onto it and used Masking>Mask by color>Mask by intensity. The Deformation Size tool was then used to make holes easily.

Showcase

Nicolas Delille

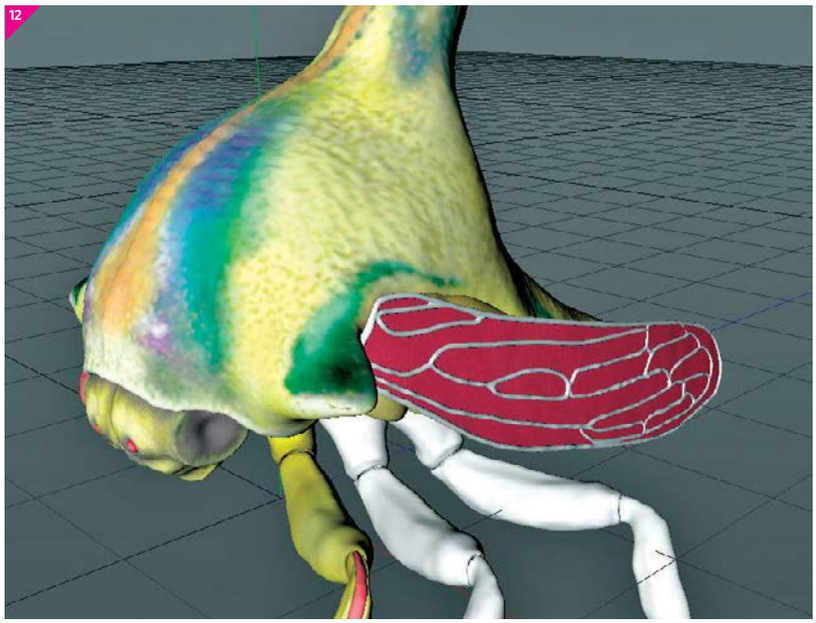
I'm an international 3D artist, currently working in Paris. My clients are based in France, England and Australia for the most part. I won some prizes and recognition for my digital works in the advertising and 3D industry. I also have a big crush on animals and nature in my personal works.

Ladybug Journey
ZBrush, Cinema 4D, V-Ray, Photoshop (2013)
Awarded by **3D Artist** magazine as the best image of the month – this is the picture I'm the most proud of. I made two images for this character.

Glossy Nature
ZBrush, Cinema 4D, V-Ray, Photoshop (2014)
Published as a Technique Focus in **3D Artist**, I wanted to skip textures to focus on the shape of the animal and do a series of glossy colourful animals blended with their environment.

Lipton - Visual 1
ZBrush, Cinema 4D, V-Ray, Photoshop (2013)
I wanted to do this fake ad about Lipton tea. I wanted to show that everybody on earth and beyond could love that flavour. So I imagined many crazy aliens' hands holding a cup of tea.

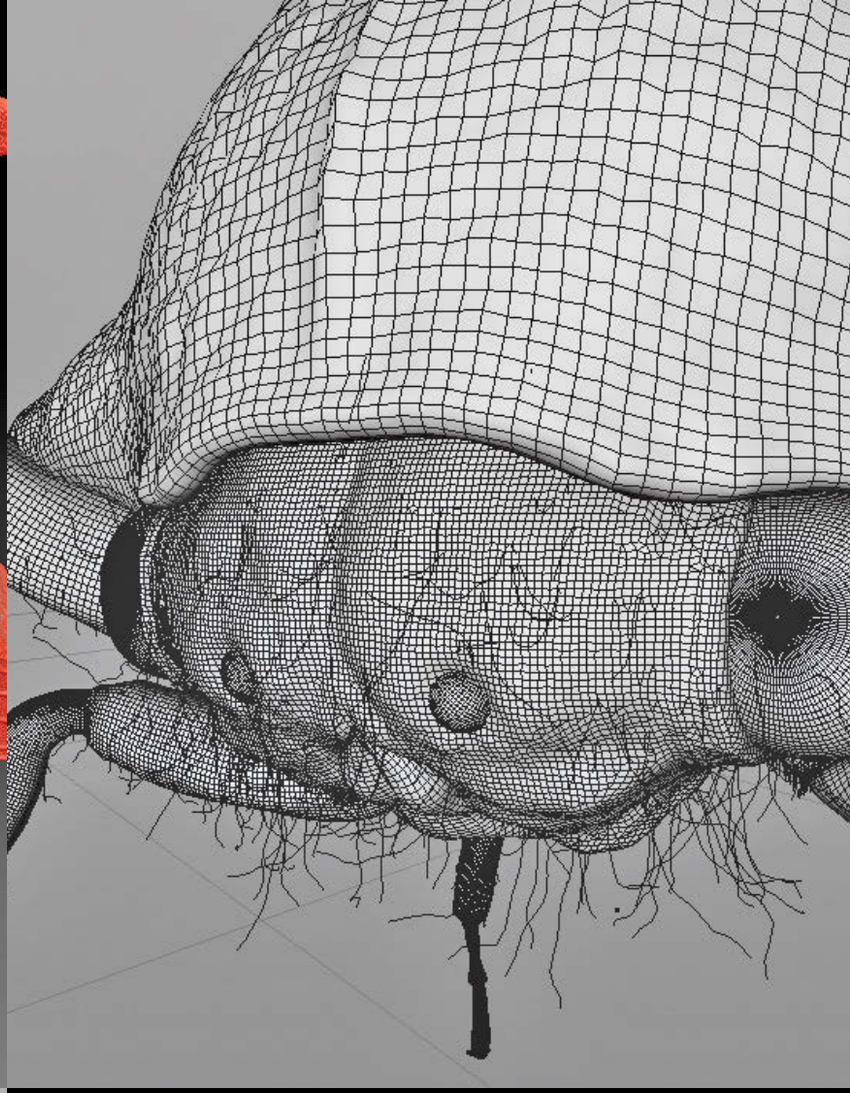
11 Finalise the insect While detailing the leg, add a tiny detail to it. The Umbonia has a red segment that was added. Whilst working with DynaMesh, you can easily rebuild the leg with the segment, then use ZRemesher and make the UV quickly. In Cinema 4D, generate the other legs with a mirror duplication. We put two little eyes in front of the head too. Pay attention to all of the details, as they will be worth it later when rendering. When we're happy with the result, we can generate maps. We must stay at subdivision 1 and generate our displacement map with standard value, and we will create our textures from Polypainting.

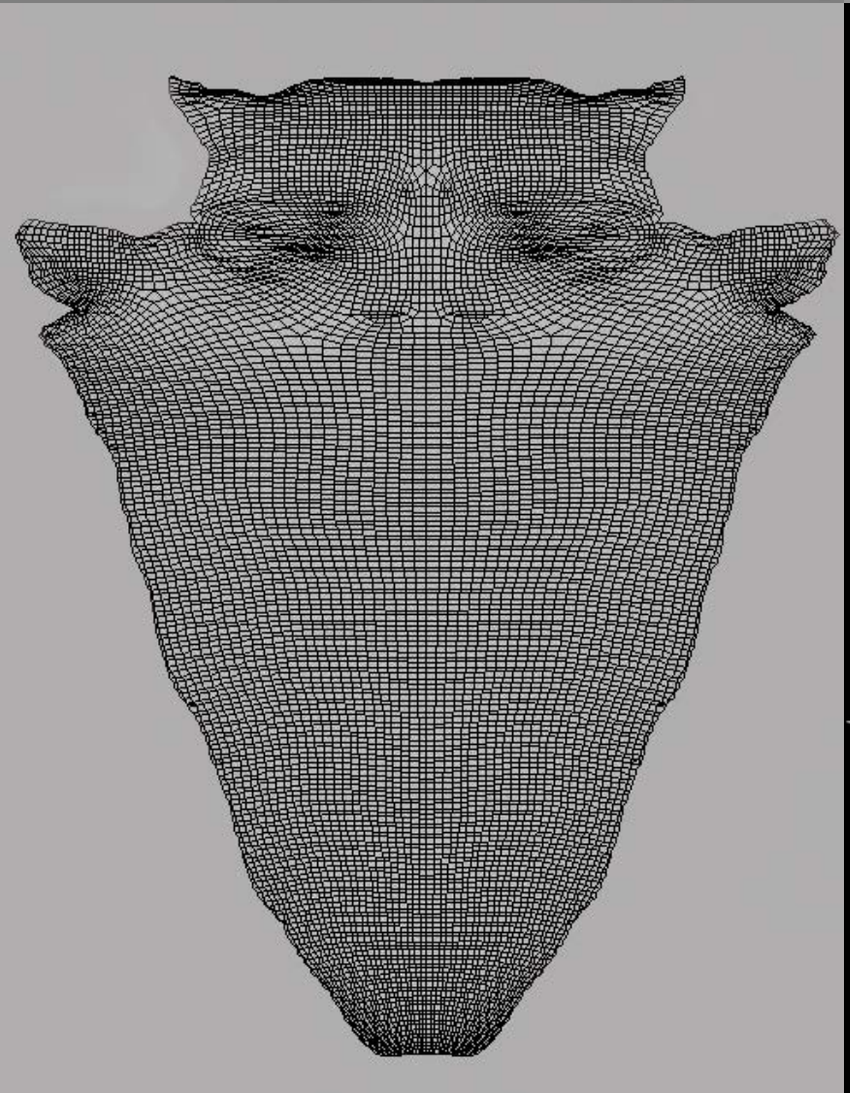


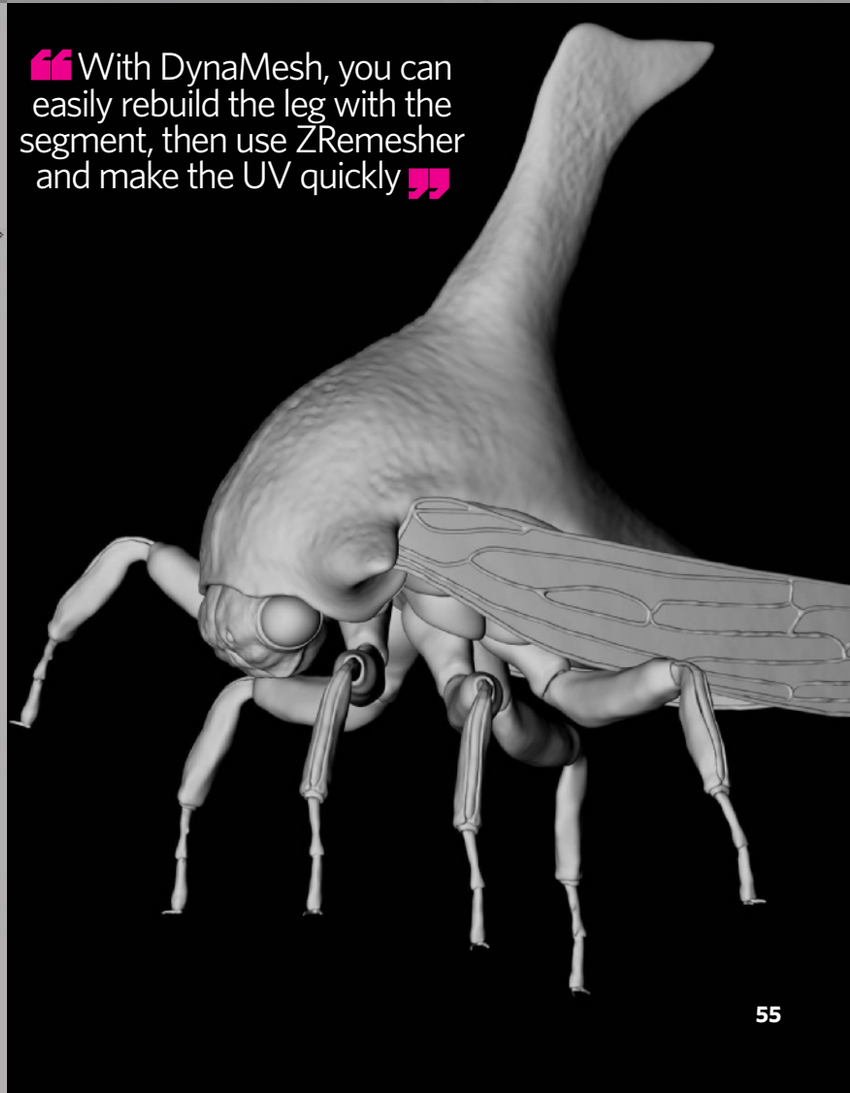
12 From ZBrush to Cinema 4D We'll leave ZBrush now and move into Cinema 4D. First of all, keep in mind that ZBrush with GoZ can create a very large-sized mesh. V-Ray is sensitive to the real-world size of your mesh, so check the size and reduce it if you have too. We divided the size by 10. You can check the Export menu in ZBrush and set all of the offsets to 0, and the scale to 1 to help, and then resend your mesh. Next, GoZ can help you to know the size of each displacement map in your material. Start by dividing each displacement number by 10. Keep the number and multiply it by -0.5 to get the right number. Now your displacement is correct. It's a good starting point for increasing or decreasing it.

Get wings with Cinema 4D R17

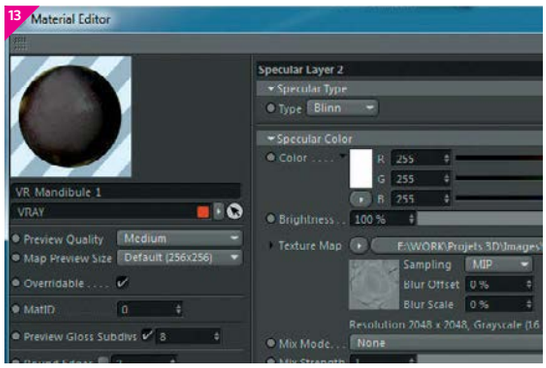
The new Spline tool feature with version R17 is impressive. You can now draw very precise curves, retouch any splines easily and use a Pathfinder. For the wings, we can draw all the inner splines separately, select them all, and choose one of the available spline options. For this example, with just one click we were able to merge all the splines together. Very handy.



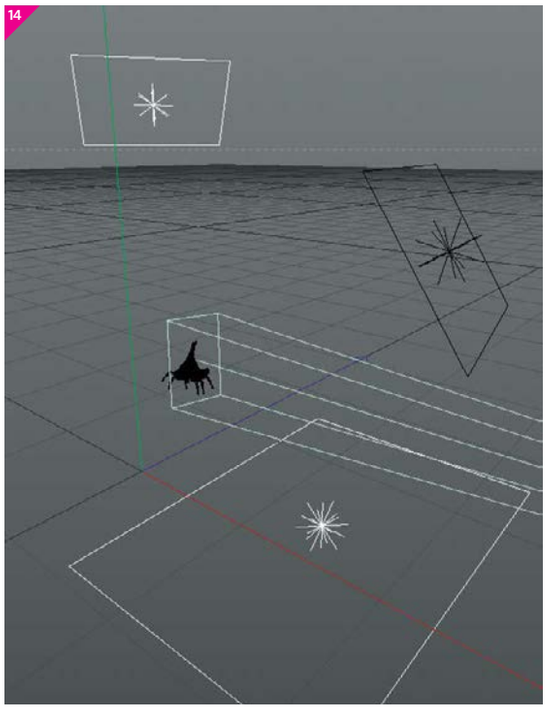




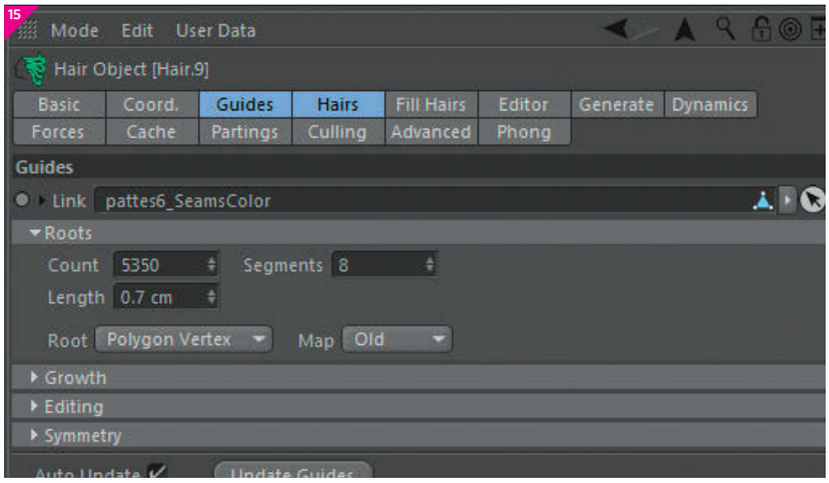
“With DynaMesh, you can easily rebuild the leg with the segment, then use ZRemesher and make the UV quickly”



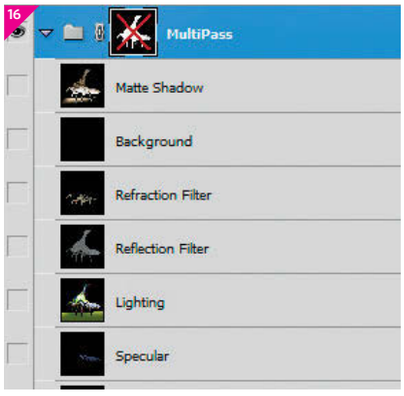
13 V-Ray materials The materials depend a lot on your lighting. For this example, we recommend you start with a simple material, like your texture and one specular layer, and do some tests. We can even start with a blank insect and do some test renders. We can use several versions of the same insects: one with only a blank texture and one with the final textures, the hair and the displacement maps. For this example, we add a reflection layer to get a nice glossy effect. You can play with your displacement map as a black and white map to add irregularity to your specular or your reflection canal.



14 The lighting Move the insect until you find the right placement, then build your lighting. For this example, we will need a strong light above and some orange light below. We definitely have to keep that in mind for the lighting and this will be the role of two of the three area lights. One for the Sun with the HDRI (as the key light), one above and one just above the camera, in front of the Umbonia, to reduce the darkness of the key light. We will use the free HDRI Topanga Forest and put the Sun from this one behind the insect. Now do some test renders to determine which area lights can be increased or decreased in value, and if the HDRI has to have a value higher than 1. For this scene, we can put a value of 2.5 for the HDRI, 15 for the area light that strengthens the sun impact, 0.15 for the area light in front, and 5 for the area light above.



15 Fur and final rendering To add some realism, let's add some hair to our insect. We will need very low values (with a thickness of around 0.006). For each part, we will do a hair object, so we will be able to control how much hair we want anywhere. We can duplicate our insect, and remove all the materials and displacement to do quicker test renders. When you are happy with the result, you can now do the final rendering with a high AA and DMC Sampler. Don't forget to assign alpha masks to your elements. You can assign a material ID for your hair material for Photoshop. Also, make sure you increase the subdivisions of your lights (at least 24). We won't be using global illumination here, because we don't need to.



16 Shadow and multipass We are at the end of the road – well, nearly! We have our raw file with our insect sitting on a green branch, as well as a file full of multipasses. With them, we can extract the insect from its background. With the material multipass we can extract the hairs, and with the branch we can extract some shadows. To do so, desaturate the layer of the 3D branch, and put the layer on Overlay mode. Tweak the levels. We can do shadows too by using a wet brush and black colour. We have a lot of multipass to play with to add some realism to our insect.

17 Final image We can play with the glow behind the Umbonia to integrate it better with the scene. With a wet white brush, we can paint on some subtle bokeh effects that will touch our insect with a low opacity. We can play with the colour correction too to add a fancy look and a blur to our final image. Try not to do too much to the render though, as some images can be ruined by the use of too many effects – they have to serve your image in the first place. Anyhow, you can duplicate layers, test different kinds of fusion modes to your layers and that's how you will find some of the more interesting effects. Hope you've enjoyed this tutorial!

The art of lighting

You can have the best mesh ever, but if you mess with your lighting, you result will not be great. On sIBLou you can find some good, free HDRIs to start off with (**hdrlabs.com/sibl/archive.html**). Build your light layer by layer. Try to find the balance between natural light and studio light to have a realistic creature sublimated by your lighting. For this image, we will use one HDRI and three area lights.

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DIFFERENT THINKING

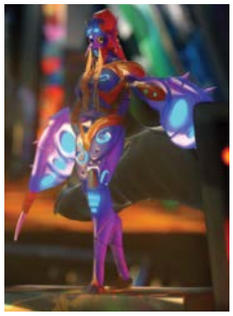
> We usually define a rough volume with the Clay_Buildup brush and then we start defining the planes with the Polish brush

MARIANO TAZZIOLI
Emperor toy, 2015

Software
ZBrush, Maya, 3ds Max

Learn how to
- Do concept modelling
- Solve any common modelling issues that can occur
- Build complex pieces out of simple ones
- Do hard-surface modelling
- Retopologise
- Work with UV layouts
- Clean the scene
- Texture
- Build shaders
- Composite

Concept
My initial idea was doing some type of mechanical creature, but instead of doing it with a hard silhouette I went for a more organic look.



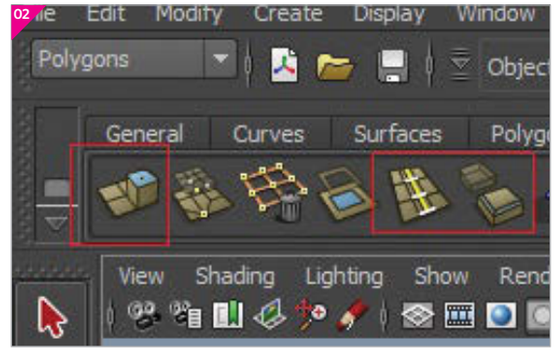
Mix hard surfaces & organic modelling

Play with modelling and materials to create a plastic toy

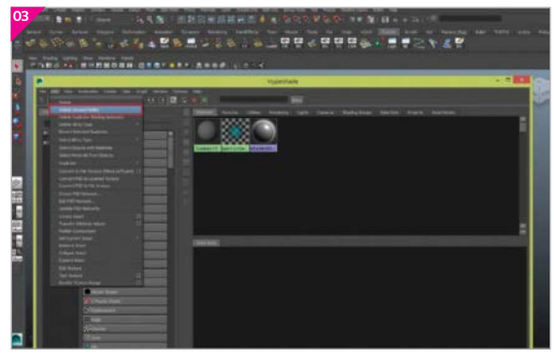
In this tutorial we are going to learn all of the modelling skills needed to accomplish a similar result to our final image. We will also explore concept design techniques as well as learn how to develop an initial idea into a final render. We will start the tutorial by learning about gathering references, doing the initial design, building a final model and working on the shading and the compositing. This process is equally exciting and fun, but what is most enjoyable is the designing, modelling, shading and lighting stages. We love the lighting stage because it is when you start to see everything come together, and in some way it's like when a baby opens its eyes for the first time!

01 The brushes The main brushes we use will help to start defining the design. These are Move, Clay_Buildup, Polish and the Clipping brushes. We will try to keep it simple, because at this stage we're not looking for a final polished model, just the design lines. So we usually define a rough volume with the Clay_Buildup brush and then we start defining the planes with the Polish brush. Instead of using the standard Polish brush we will use the hPolish brush because it has a harder stroke and better definition. To use this brush you have to go into the Lightbox, then Brushes and then in the Polish brush folder you will find the hPolish brush.

02 Maya tools Try to keep the workflow as simple as possible for modelling. In Maya the tools that we will use are Extrude, the Insert Edge Loop tool, the Cut tool and Bevel. For getting quick access to those tools, we have a custom shelf with all of those tools and many more just in case. It's important that when you mirror a piece to put in a scale of X with a value of -1 to check your normals and your UVs, because when you mirror a piece it could be that your normals and UVs get reversed. So the proper thing to do after mirroring would be to check those two things. For the normals you can go under the Shading tab and check 'Backface culling' – this will reveal to you which faces are reversed.



03 Clean the scene Another very important thing to do when you get to the point of finishing the final model in Maya is to select all the pieces, then move all of the pivot points to the centre of the scene and hit Freeze Transformations. With this you will make sure that all of the pieces have been zeroed out. Then in the Hypershade hit Edit>'Delete unused nodes', and this will delete all of the garbage nodes. After that simply right-click over your outliner and click 'Show DAG objects only', then in the search tab of the outliner type in 'hyperView'. You can delete all the nodes that you don't need as they will make your scene heavy. It's also a good idea to delete your history, delete all of the layers and then assign the standard lambert to all of the geometries.



04 Trigger your ideas Once you know your design concept, it's time to jump into ZBrush and trigger your creativity. In this initial design phase you don't need to define all the shapes and have it all clean – this phase is just for exploring and letting your hand find the shapes and volumes freely to get an idea of what are you looking for. The important thing here is to define a good silhouette or thumbnail.

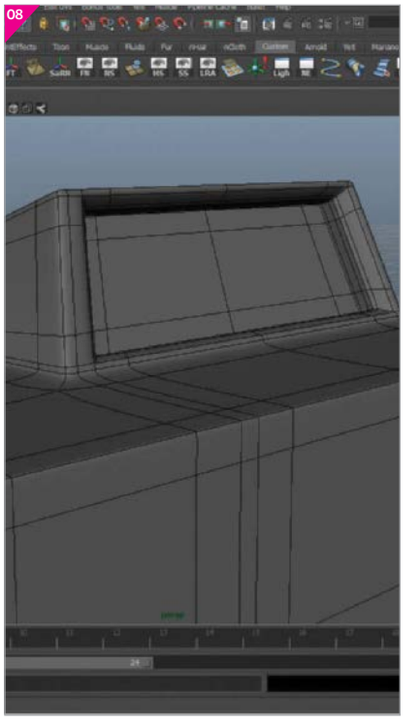
Look development

I usually do the look development of dome elements before putting them into the scene, for example for the chair I did a look development where I ended up developing the shader for it. It's good practice to do this in a neutral lighting condition so you can see if the shader reacts properly to light.

05 Pass the control to your hand As this is a purely creative piece you can start moving and pushing geometry around; the workflow that we use in this type of artwork is always the same. We start from a base mesh that was done previously, then we start to mask parts and deform that geometry to create the shape and volume that we are looking for. You can also just create a new primitive and start deforming it as well.

06 Being dynamic Keep trying things until you reach the point where you like what you are seeing. Don't get attached to your initial designs – keep working and changing. As you see in the image we are working on the process although the final modelling is not done. We have started doing a shading and lighting test though, and also in this phase we can decide on what is working and what's not working.

07 Polish Once you are happy with the initial rough design in ZBrush, it's time to clean it up and start defining the pieces more and more until you get to a point where the model is polished enough to be retopologised in Maya for the final design.

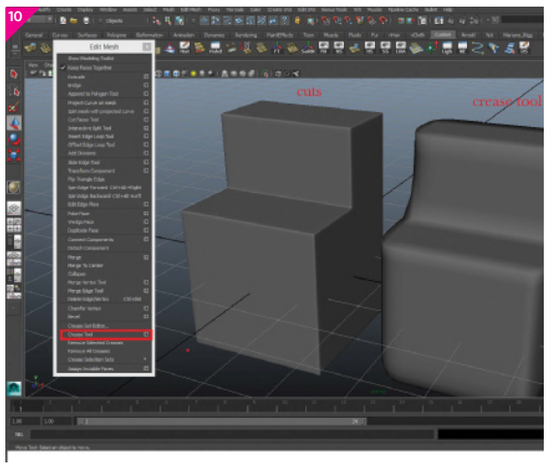


08 Modelling tips In hard-surface modelling the pieces are not supposed to deform, so keep triangles where the topology may require it, but try to always have the maximum amount of quads because they are always cleaner. Having triangles in certain areas may produce dome pinching, so if you need to have triangles it's better to have them in areas that are not too visible.

09 Prepare for exporting For the retopology stage, you will need to export your ZBrush model to Maya or 3D-Coat or to whatever program you use. To do that, you should use the Decimation Master so that you can triangulate your model and optimise it so that your traditional 3D package can handle it. To do that, just select the piece you want and then go into Zplugins>Decimation Master>Pre-process Current and after this is done, click Decimate. The lower the value in the Decimaton Master slider is, the more optimised your model will be in the end.

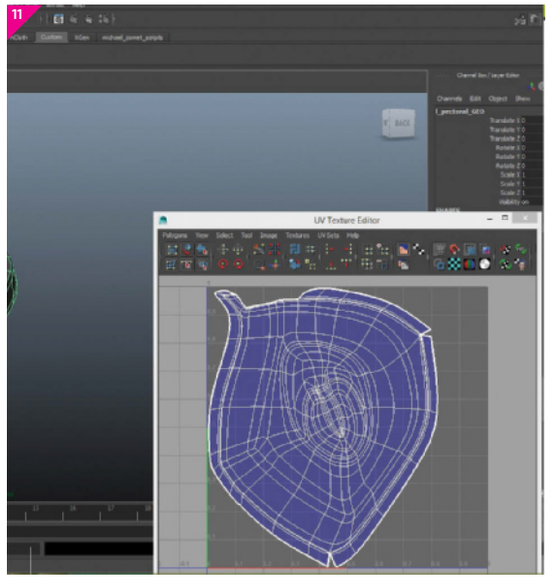
Naming conventions

A very important thing to do is to name all your stuff properly, because that way you have it all organised and you can filter your objects by name. Also it makes the scripting task easier. I usually put this at the end of my objects with 'GEO' but you can put any name as long as you follow the convention during the process.



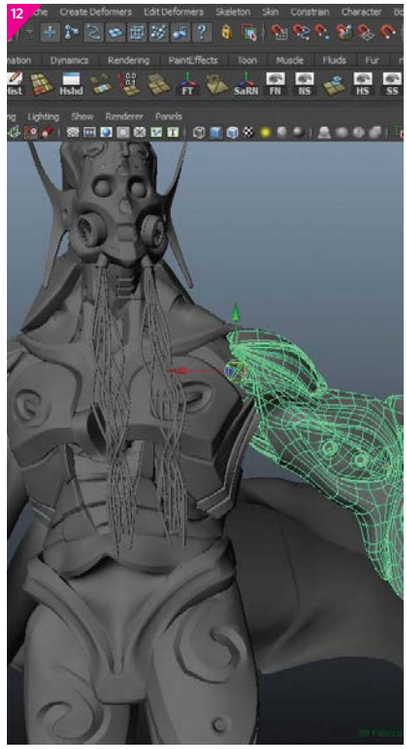
10 Optimise the model Use only the quantity of loops that you need, for doing a hard edge you only need three loops. The other way of creating loops is by using smaller pieces of geometry which are further away from the camera because it doesn't produce the same type of bevel as cutting in the actual geometry. This method uses creases with the Crease tool in Maya; this does not cut the geometry but tells the smooth algorithm to apply a smaller value in that edge. This second method is more optimised because you don't have to cut, so you have fewer polygons.

11 UV mapping Once you have finished the modelling process, it's now time for us to work on the UVs. They may look too complicated to do with our complex-looking pieces, but if you remember that complexity can be accomplished via the union of simple pieces, you will end up with a very complex piece made up of simple ones. You will end up working on some easy UVs. When you are giving a double-sided surface to a piece, instead of simply extruding, you can also select the border edges and extrude them so that you only end up with those edges instead of a back face.

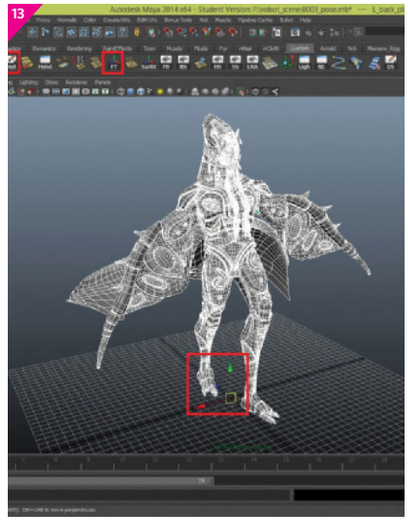


Scripts

One important part of your workflow is to have tools that can speed up your work, so scripts can be very important. For example, you can use scripts for renaming stuff or for transferring UV maps to multiple objects at the same time. If you're not very technical just download them from the internet, otherwise try having a go at making one yourself.

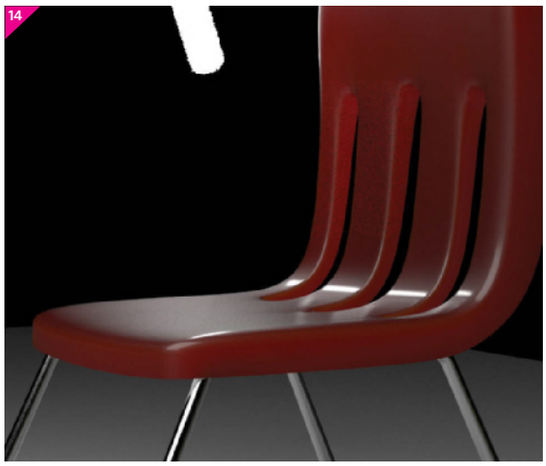


12 Pose the model You can pose the model in ZBrush or in Maya, but this time we decided to pose it in Maya. Now for doing this you can either do a basic rig or simply parent the pieces hierarchically. Of course if you do a rig you don't need to do a bind, you just parent the pieces to the joints.



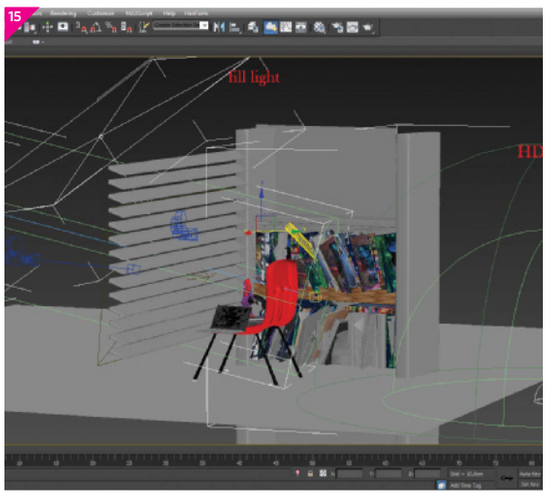
13 Clean up the scene Once you have finished with the modelling and the UVs, clean up the scene so that you can start the shading, lighting and rendering part. First select all the pieces, move the pivot point to the centre of the scene, then freeze the transformations and delete the history. Now if you left a piece with a negative value in the scale then the UV will be reversed, so you have to review the UVs and correct them if they are reversed. It's also a good idea to rename all the pieces with a suffix like 'GEO' so that you can filter the pieces by name. Then assign the lambert1 shader to the whole model and delete all the unused nodes in the scene.

14 Prepare for rendering So now that we have the pose and it's all prepared for starting the lighting and shading process, it's time to set up the scene. We usually do this step in 3ds Max, so first import all of the geometry into the scene and decide which type of camera we want. For doing the scene we just modelled some props for a library which includes a chair, a computer screen and some books. We just wanted it to look as if this robot was some type of toy. This was the only part of the room that was modelled for now.

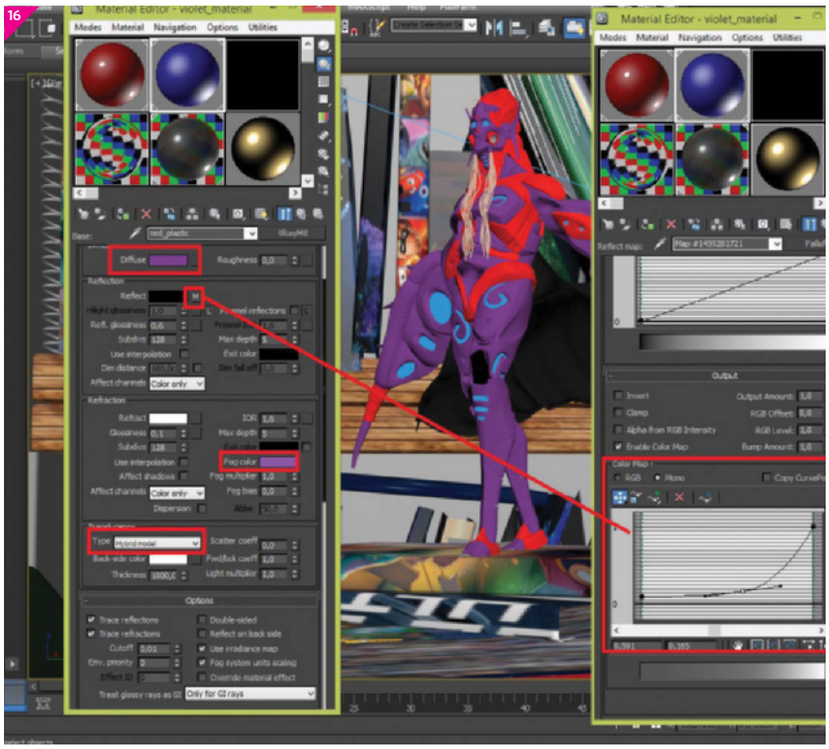


Keep active

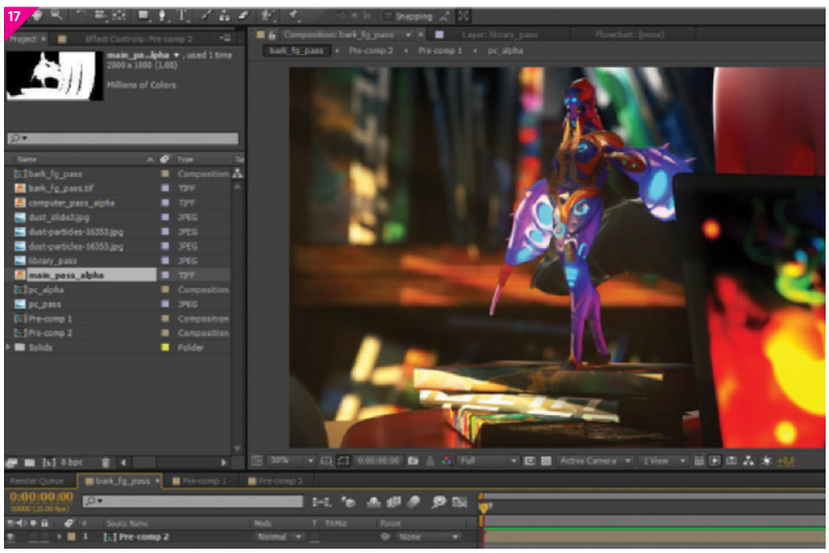
It's very important as an artist to keep yourself active: always looking for new techniques, always trying things and always being inspired because that's how you grow as an artist and how you learn. Always try to push yourself beyond your boundaries.



15 Light the scene We wanted to give the image a warm and colourful look, as if the light was entering the window from the left to give the image much more depth. So we started off by using very soft and warm HDRs for the overall lighting. After that we situated the key light to make it so that it came from the left, which would be light from the Sun. And then we start to light areas with some bounce lights. The key light that was used was just a directional light and the bounce lights were area lights.



16 Shading and translucency Since we wanted this to be like a toy we wanted to give the model a plastic look. A thin plastic was created with some translucency to create a more appealing look. For this effect, what we did was create a standard VRayMtl with a violet tint. In the reflection a falloff map was plugged in to provide a fresnel effect. Now comes the important part, which is the Refraction slot and the Translucency tab. In the Translucency tab just set the Translucency type as Hybrid, and then set the fog colour in the Refraction tab to violet. This is going to give the material a translucent look. For the glowing parts we created a VRayMtl. The material for the chair is the same as the robot but red.



17 Compositing To focus on the robot toy, blur out the background and the foreground. To do that, we rendered the scene in three passes: the foreground (computer screen), the midground (robot) and the background (library). So now we have control over the three layers. In After Effects, a lens blur was applied to the background and foreground, then Magic Bullet filters and colour corrections were applied to the highlight areas to provide a warmer look. After that, we saturated the image a bit in Photoshop and painted over it with Color Dodge to bring more light to some areas of the scene.

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Technique focus

Incredible 3D artists take us behind their artwork

POST-PROCESSING This piece has been entirely made in ZBrush. Everything from sculpting and polypainting to rendering and colour corrections were done in there. The only exception are the snowflakes which were added in Photoshop. Still, they could easily be re-created in post-processing with the BPR Filters in ZBrush.

Ekaterina Pushkarova - Katerin
ekaterinapushkarova-katerin.tk
Katerin worked in the videogame and film industries on projects like *Conan The Barbarian*

Software ZBrush, Photoshop
1789, 2015

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HOUDINI

Houdini 15 PBR shaders

This tutorial covers the creation of the brand-new PBR material in Houdini via the use of the new Mantra features and a material shader builder. Many software packages are delivered with pre-made material libraries, materials which can be applied on the fly. The problems are that many of them are crowded with options that don't really fit the situation, and that every production will end up looking the same. This is where this tutorial can help you out.

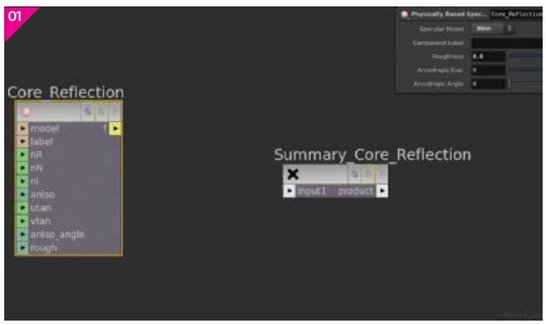
At first we start off by creating a new VOP material – which is the Mantra material shader builder. The object of desire to be given a new look is a Christmas tree bauble. Therefore we'll simply skip the diffuse part and investigate the reflections. A Christmas tree bauble has a huge reflective part, so the idea is to create a layered PBR material with a core reflection, an almost clear reflection on top of it with a rim light effect and, last but not least, a third layer which covers dust. The core reflection will be a fairly rough specular highlight that is a little bit different from the norm. Instead of choosing one colour, the reflection colour will come from a gradient to give it a more realistic feeling with manual colouring of different reflection angles.

The second layer acts like a coat over the core reflection. Just think of the core reflection as a base colour. Then, a kind of clear varnish comes right over the base. With this tutorial comes an underlying Houdini scene on FileSilo, where a HDR map and some environment lights are in place. Some slightly blurred reflections will appear on the varnish here. In addition we will add an intensity and simple colour parameter.

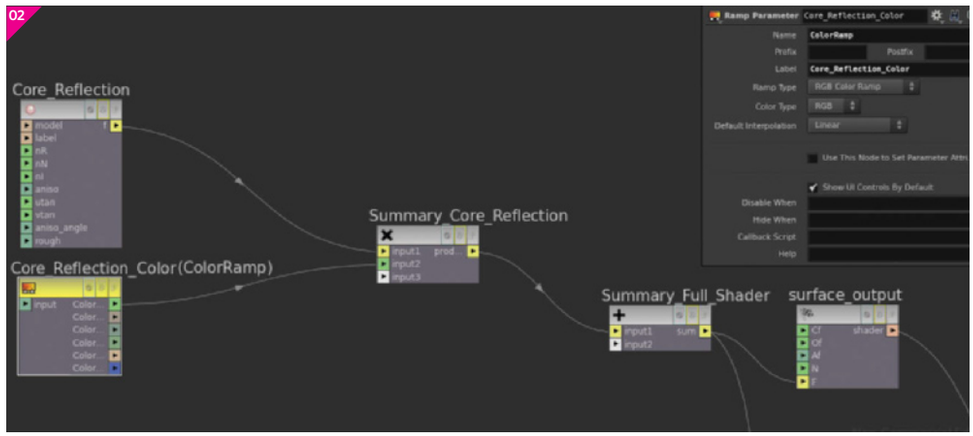
The third layer with the dust will be the most interesting to us. At this stage, we will work with a noise node where the noise will have a reflective value as well. This layer will also have an intensity and colour.

For all three layers we will use special reflection behaviour. A common problem in shader building is the artificial look of the material. To avoid an artificial look we will make use of fresnel blending. In Houdini the fresnel blending usually goes from zero to one. To imitate behaviour that occurs in most other software packages where the values go over one, we simply create a setup to let us work with any values over one.

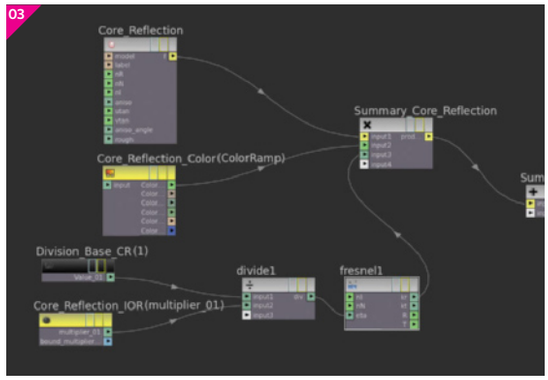
01 Preparation for the base reflection First we open the H3DA_CTB_Start.hipnc scene that is available on FileSilo. Let's dive into the Christmas_Ball geometry node and then open up the SHOP network. Afterwards we will open the Tool menu and add a Material Surface Builder node which is the VOP material. We will call it 'christmas_tree_ball' and jump right into it. The surface output node is most important and we will now ignore the diffuse, a step that we mentioned earlier on in the introduction. We must now add a PBR specular node as well as a multiply node. We give the reflection node a name like 'Core_Reflection' and a roughness value of 0.6. Then, our multiply node will get 'Summary_Core_Reflection' as a name.

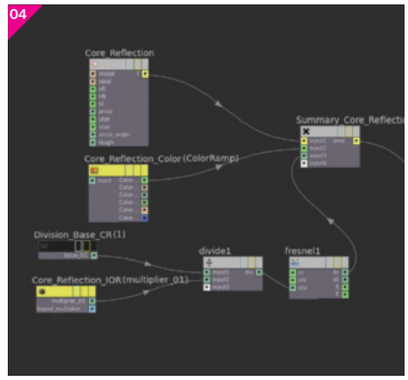


02 Time to bring in colour Now, as the PBR specular node is in place we must add a ramp node and name it 'ColorRamp'. The label will be 'Core_Reflection_Color'. First we connect the yellow F output from the PBR specular with the first slot at the multiply node – in this case the F is for the BSDF functions. This step is important because the first slot will define the multiply output. The vector output of the colour ramp must go into the second slot of the multiply node. Let's create another node with the name 'Summary_Full_Shader' and then plug it between the multiply output and the BSDF surface output.

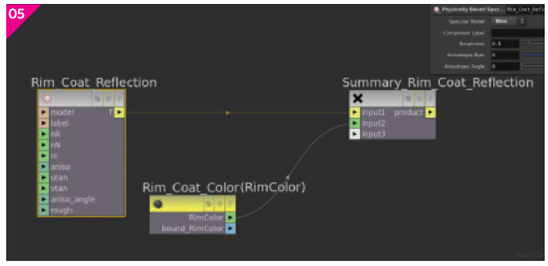


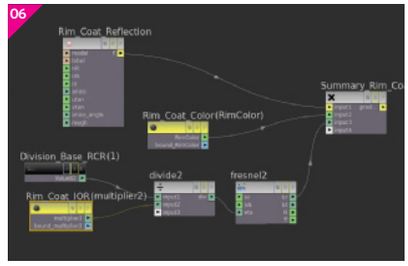
03 Unequal reflections through fresnel The reason why some materials look artificial is because of how reflections work, which is usually equal in all directions. To break this behaviour and give it a realistic touch create a fresnel node. First connect the kr output (reflected light) with the third multiply slot. What's left is a small control structure to allow values over one, as we are used to doing in other software packages. Let's create a parameter node, a constant node and a divide node. Divide the constant with the parameter and plug the divide node to the eta slot of the fresnel node.





04 Set up correct reflection limits The setup for the fresnel control is in place, but let's name it properly. We label the constant node 'Division_Base_CR' and give it a name like 'Value_01'. The parameter node label will be 'Core_Reflection_IOR' and its name 'multiplier_01' with a start value of 4. The naming here is really important as we work with more parameters and constants. To ensure that we achieve a realistic look, add a conserve energy node and plug it between the last add node and the surface output node. Conserve energy ensures that a surface doesn't reflect more light than it has received.

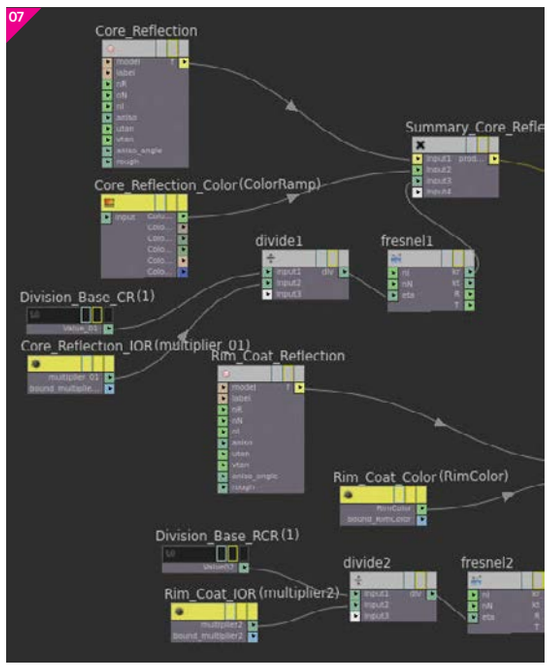


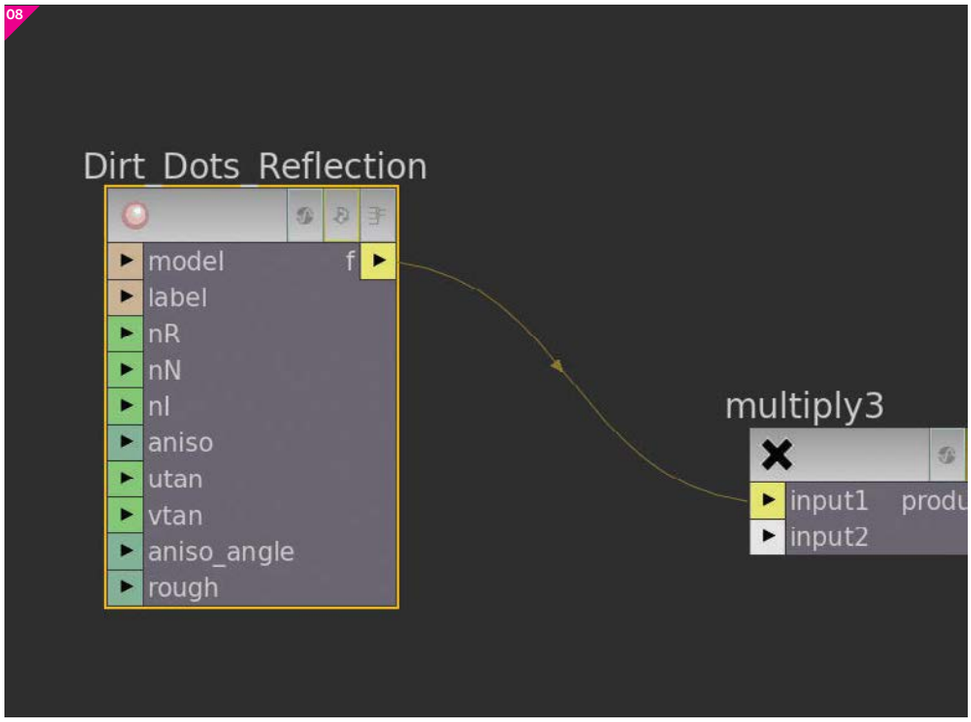


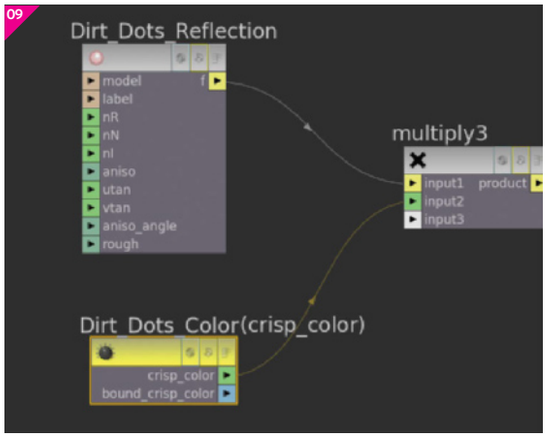
05 Time to add clear varnish The varnish setup is quite similar to the base reflection. Let's start off by adding a PBR specular node, a multiply node as well as a constant node. We call the specular node 'Rim_Coat_Reflection' and we will give it a roughness value of 0.1. The smaller the value gets, the sharper the reflection will be. Choose Blinn as the specular model. Now connect the F output of the specular node with the new multiply node and call it 'Summary_Rim_Coat_Reflection'. Colour information will come from the constant. We label it 'Rim_Coat_Color' and set the name to 'RimColor'. Under type we choose Color. Now, let's connect it to the second input of the Summary_Rim_Coat_Reflection multiply node.

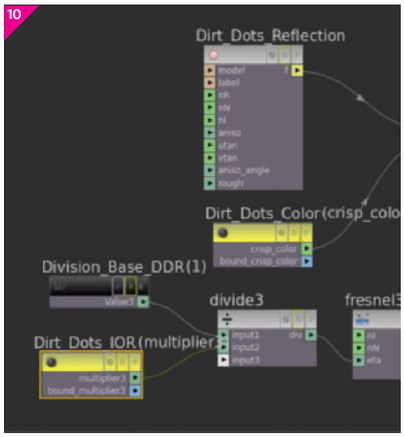
06 Add a natural reflection again The core setup is mostly done for the clear varnish. But let's add a fresnel setup to it again. This time it will be easy – we copy and paste the four nodes from the base reflection and append the copy at the third input of the Summary_Rim_Coat_Reflection multiply node. Let's label the constant as 'Division_Base_RCR' and give it a name like 'Value02'. The parameter will get the label 'Rim_Coat_IOR' and a name 'multiplier2'. Then we change the value to 1.3. It would be good to create an intensity value here so we must add a new multiply node and a parameter node.

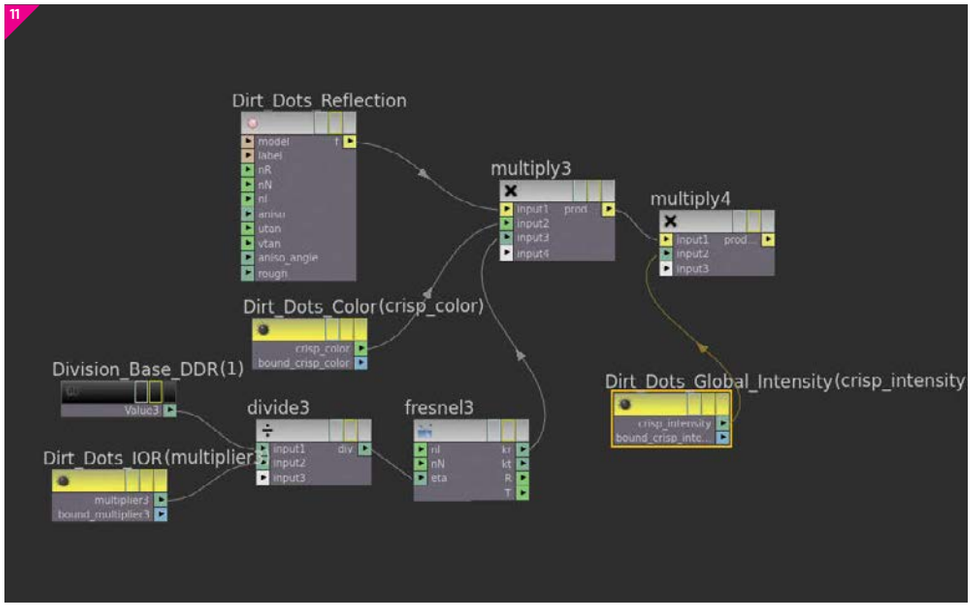
07 Add an intensity control The two new nodes will help us to control the overall intensity of the varnish layer. We leave the label of the multiply node as it is and put our focus on the parameter node. Let's call the new parameter node 'Rim_Coat_Intensity'. For the name we use 'rc_intensity', and this will do its job but change the float value to a value of











something like 0.6. Now we integrate the setup. We must put the multiply node between the add node which we called 'Summary_Full_Shader' and the Summary_Rim_Coat_Reflection multiply node. The second input of the multiply node will be the parameter Rim_Coat_Intensity.

08 Prepare the dirt layer It will be a bit more tricky with the dirt as we need an excluded noise. Let's create now a new multiply node as a root for the whole setup. In the first instance, we must add another PBR specular node. We label it 'Dirt_Dots_Reflection' and type in the value 0. For the specular model we stick to phong because it gives us a sharper reflection result. Afterwards we connect the F (BSDF) output of the specular node with the first input of the multiply node. Don't forget, the first input of a multiply node drives the multiply output.

09 Colour the varnish dirt We have the PBR specular for the dirt in place now. As we have a routine in this process, it will be easy to add a colour variation node again. We do this by adding a parameter node. We label it 'Dirt_Dots_Color' and set a name like 'crisp_color'. For the type we will choose, as we already know, the option colour. We'll imagine that the christmas bauble hangs around in a dark ambience with candles and warm light sources. Let's add a colour which fits our idea with the RGB values of: 0.9, 0.156 and 0.125, which will be a light red colour. Now connect it with the second input of the multiply node.

10 Add proper reflection capabilities We will now do a bit of work before we actually start working with noise generators. Again we must use our fresnel setup which we made two times before. Then we can change the IOR of the dirt as well. We copy the setup from our core reflection and paste it all the way down next to our PBR dirt specular. Let's relabel the constant to 'Division_Base_DDR' with a name of 'value3'. Afterwards we label the parameter 'Dirt_Dots_IOR' with a name like 'multiplier3'. A strict naming convention is really important in our work because if there are the same names hanging around, it won't work.

11 Control the dirt strength An important point is to let the dirt look quite realistic with a special visibility level, for example by adding in small scratches and dots from wear and tear. Therefore, we need to create a new multiply node and a parameter node to build an intensity setup. The multiply node, which holds all inputs from the PBR dirt specular, must be connected to the first input of the new multiply node. The second input will

go to the new parameter. We label the new parameter 'Dirt_Dots_Global_Intensity' and give it a proper name of 'crisp_intensity'. Put in a value like 1.2 to test the visibility.

12 Plug in the noise

We are ready to finally add some cool stuff now. Let's bring in a unified noise node. As we can see right away it is full of options to play with. Let's call the unified noise node something like 'Noise_For_Dots'. Before we start adjusting the noise itself, we connect it in our big setup by taking the noise float output and connecting it to the multiply node, which holds all of the nodes from our PBR dirt specular. To make something visible we need to connect the output of the Dirt_Dots_Global_Intensity multiply node with the add node called Summary_Full_Shader, just before the conserve energy node – our layering node.

13 Adjust the noise functionality

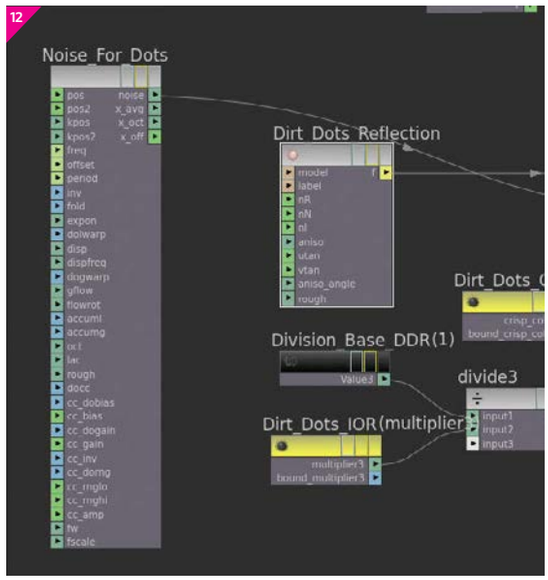
Before we work on the noise we must add a rest position node. We plug it between the surface globals, which we haven't touched until now, and the unified noise. What this node does is basically take the input of the point positions to a specific space. In our case it will stay in the NDC space, which means that the node takes world space information from the points and transfers them into a screen space. As a result we get bigger dirt effects, which are a bit stretched around the surface.

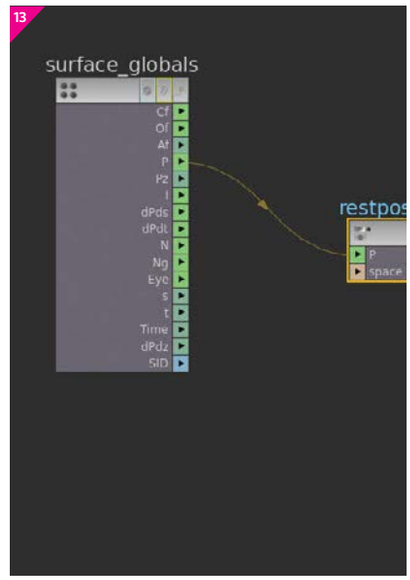
14 Work on the noise behaviour

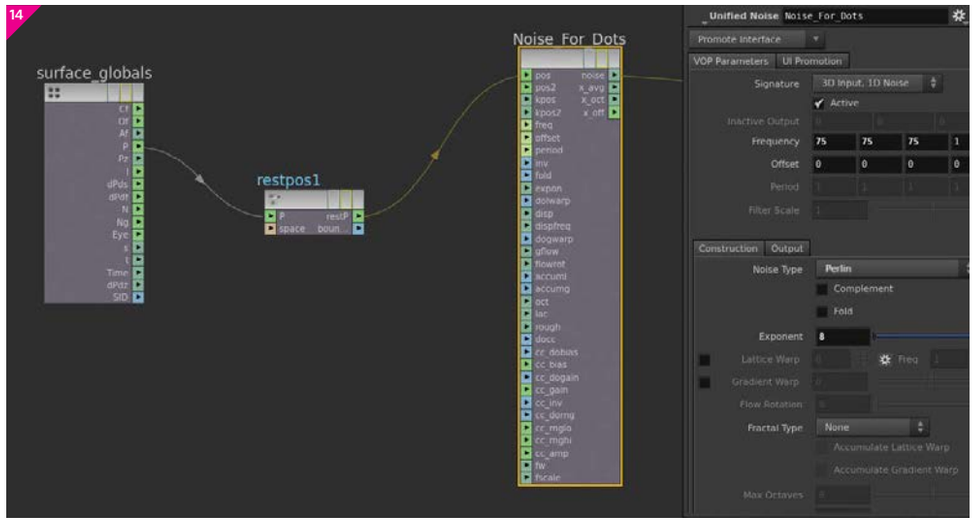
Right now the noise doesn't look like how we want it. To change that we jump to the unified noise node and take a closer look into the parameter. What we want at first is a higher frequency to get more detail later on in the noise pattern. Let's increase the frequency for XYZ with a value of 75 in each. There's one more thing that we have to take care of right now – the setup of the noise. Right now it looks okay but still not like spreaded noise dots, so what we must do is invert the noise output by activating the flag complement.

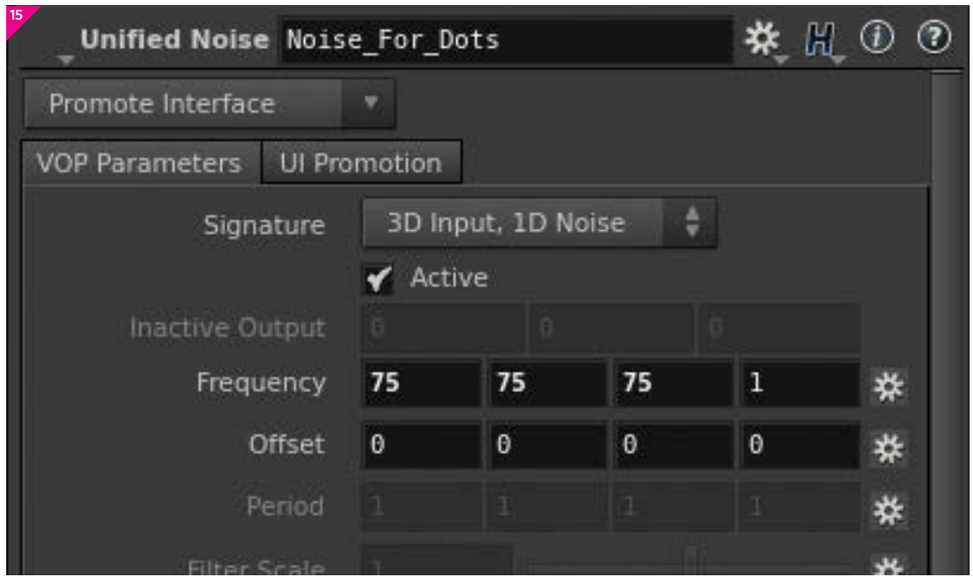
15 Finalise the setup and rendering

The last step goes more into the look development process. This is where we go into the adjustment of the exponent level in the unified noise setup. We keep it at a value of 8 and when we render we should see some noise spots around the Christmas bauble and the tree. The scene is properly set up now and by switching from the 3D viewport to the render view, every change to any parameters will be immediately visible. Feel free to play around and create different behaviours.





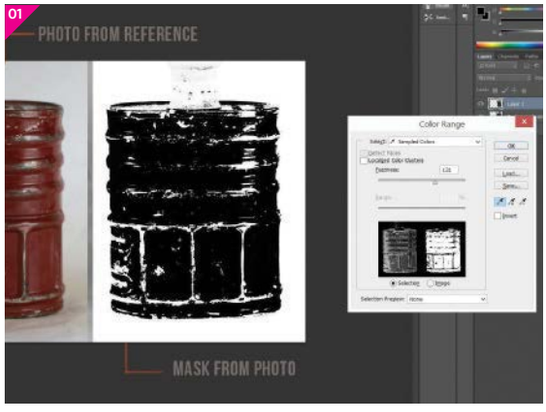




MARI

Advanced texturing in MARI

Over the next few steps we are going to create a photorealistic gas mask using advanced texturing methods in MARI. We will explain the importance of having good quality UVs and how strong specular maps can make your object look real. Additionally, we will cover some methods to speed up your workflow and explain how keeping an organised scene can make your life easier. Texturing realistic objects is a process which requires a lot of patience and an understanding of light and colour. It also requires a good eye to understand how objects work in real life.



01 Reference in hand In order to create a photorealistic asset, it's really important to understand how materials react to the light, and if you have the opportunity, make sure to have an object that you could physically handle and observe in reality. Another advantage is that you can use it for photoshoots. We are going to have two different photoshoots, one for reference and another one for creating masks for projections. To do so, bring the photos into Photoshop and use Colour Range and Levels to extract a mask from it. Also, make sure that you are careful with the specular highlights.

02 Texture resolution Before starting the UV process, you need to determine how close the camera will get to the model. The general rule for films is that there should be double the final resolution of the piece in texture resolution. Having this in mind will let you have the exact amount of UV tiles. It's also important to have a uniform texture resolution across the entire model, except for very small pieces.

03 Plan out the UVs Everyone has a different way of laying out their UVs and the way that works the best for us is to separate them by materials. Since we like to bring the combined object into MARI, having everything divided by materials will make your life easier in the future, allowing for faster selections. Another important thing you must consider is

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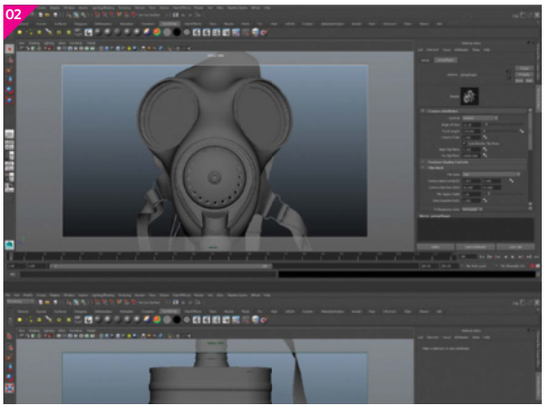
making sure you don't get any stretching. A texture will stretch around a hard edge if that seam edge isn't reinforced properly. To avoid this, add extra support edges around hard edges and choose your seam edges with caution.

04 Supporting maps Before jumping into MARI you must consider baking an edge mask in ZBrush and an ambient occlusion map in Mudbox. Those maps are going to help a lot during the texturing process, since they can be used as masks to drive details in specific areas. The edge mask also helps darken the edges of metal objects in the diffuse and specular maps.

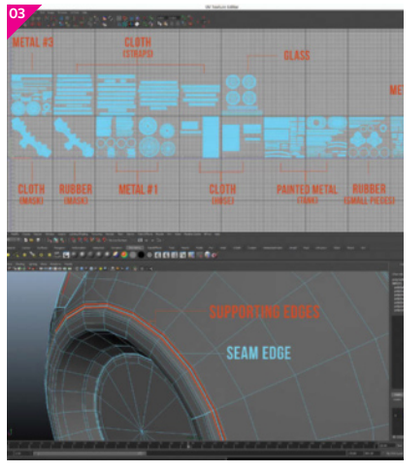
05 Diffuse map The first map we are going to paint inside MARI is the diffuse. Import your combined object into MARI, create a new channel and make sure to check if your tiles have the correct resolution. Once you have everything, you can start using a tileable texture that matches your material. Then you can build up the complexity by blending in different textures on top, aiming for interesting variations on the colour. By using textures such as concrete or plaster you can achieve distinct colour breakups, but it all depends on the reference you are using.

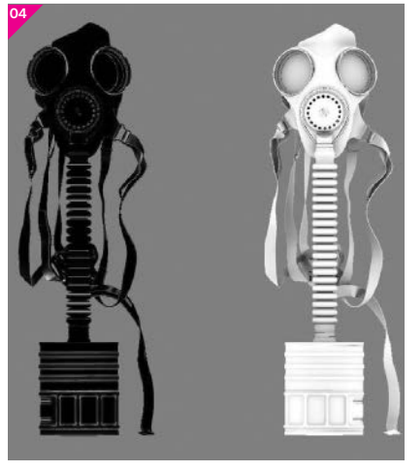
06 Specular and roughness map After finishing the diffuse, you can duplicate the channel and start converting it into a specular map. You can start by adding a luminance adjustment on top of everything to get rid of any colour information. After that you should tweak each layer and try to get the best value range possible. The roughness map is going to do a similar thing to the specular, except the tonal values don't determine the specular intensity, they indicate specular highlight softness. Using V-Ray, white areas in the roughness will create a tight specular hit, and black areas a broader and diffused specular.

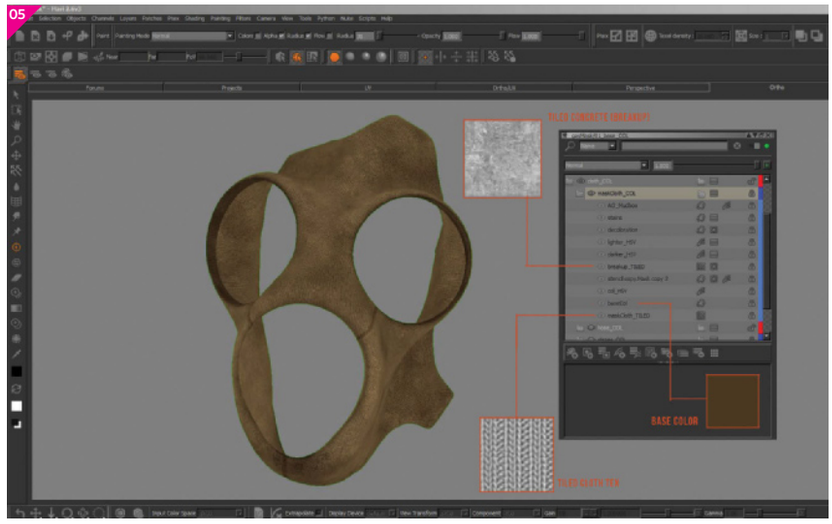


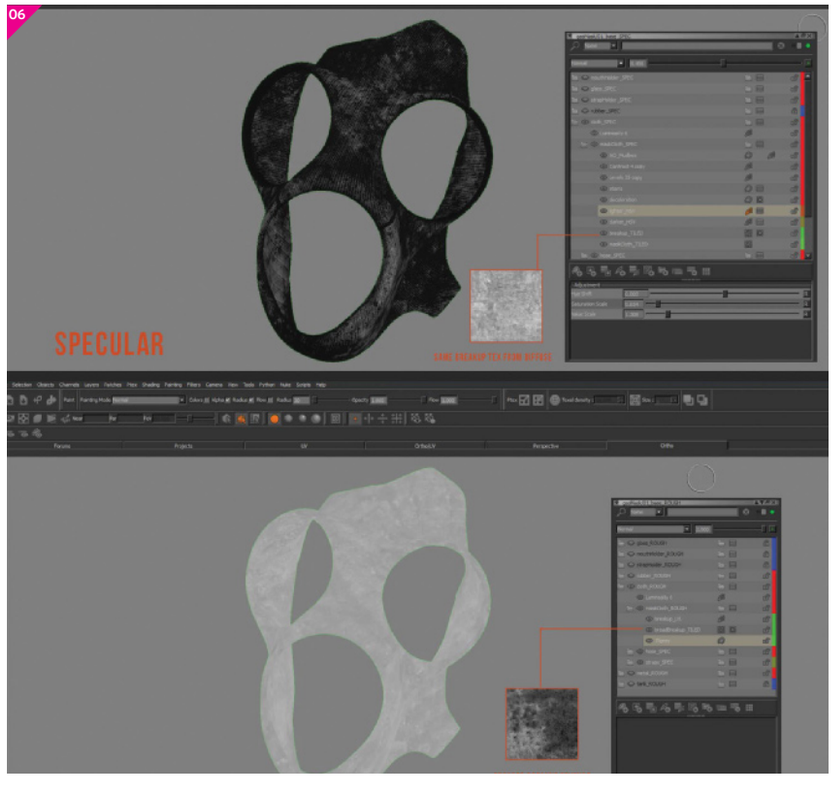
Complexity requires organisation

During the texturing process in MARI you can end up with a crazy amount of layers and channels. An organised scene is vital to making your life easier, so create a name convention that makes sense and use it for everything. Another tool in MARI that can help your organisation and also speed up your workflow is selection groups. This way you'll be able to work without worrying about losing track of your materials and textures.





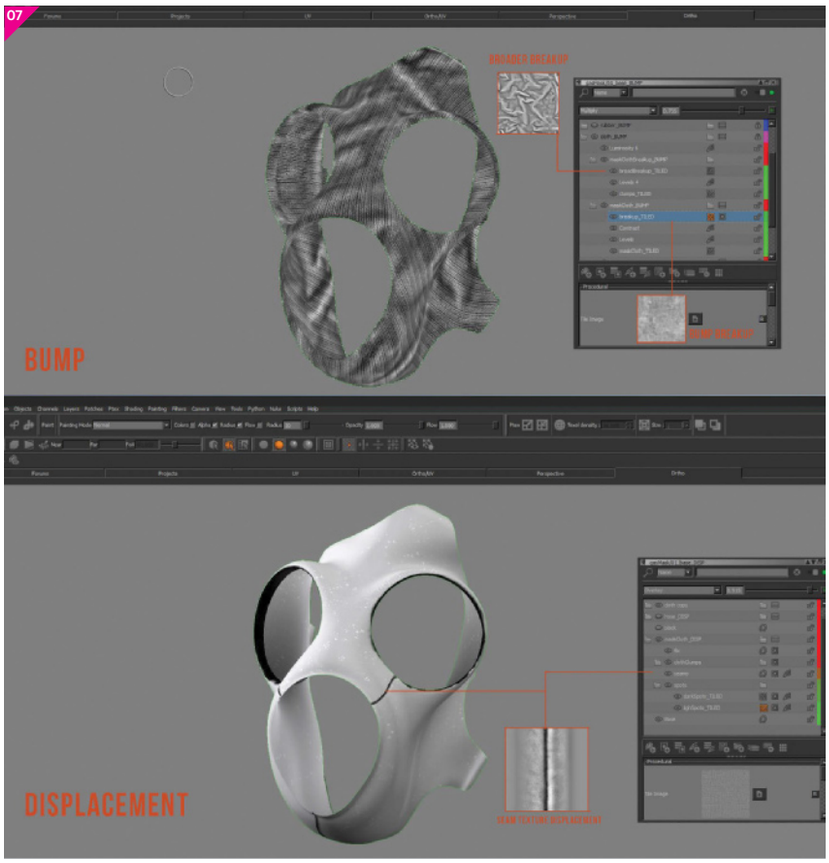


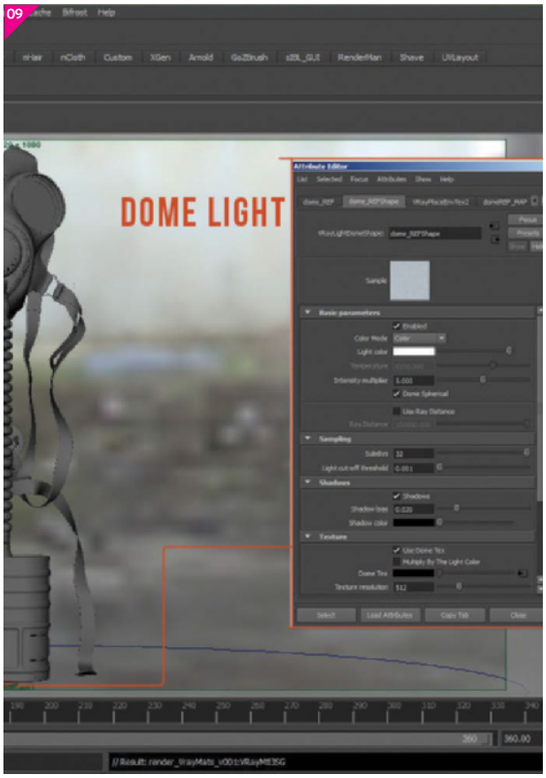


07 Bump and displacement maps For the bump map you can start by using textures that match your reference and tileables, but make sure you tweak those by adding a breakup texture as a mask. This way you will be able to achieve a more believable surface detail. Sometimes you may need to break the silhouette of your object – that's when a displacement map comes in handy. You can create an 8-bit displacement in MARI, where white areas will be displaced outwards and black areas won't be affected.

08 Achieving realism After working successfully on the broad aspects of your object, make sure to spend some time adding details such as decals, numbers, seams and so on. This refining stage will make your object even more interesting and realistic. Also, used objects get dusty and dirty; you can apply these details on a separate layer using a smudge tileable texture. You can also use the AO map, created previously as a mask, to drive the dust and dirt into occluded areas. Avoid overdoing it though, otherwise you will lose all the work that you did previously.

09 Look development Now that you are done with all your maps, it's time to move into V-Ray and start the look development phase. Keep the light setup simple and use a good HDR. Colours can be distracting in the beginning, so you can begin by using only your bump and specular maps to find the correct values. Make sure you adjust your materials separately and use blend materials if you need. Keep going back into MARI to adjust your textures if you judge it to be necessary. Once you're happy, just press render.





> You can use the AO map, created previously as a mask, to drive the dust and dirt into occluded areas

Build a texture library

A texture library is one of the most important tools in the texture painter toolkit. After each project, ensure you collect and save all the textures that you have used. Be organised and separate everything properly; this step can save you a lot of time in the future. Also, get used to creating tiled textures from your regular textures and create a folder just for them, and create a separate one for masks that you've created.

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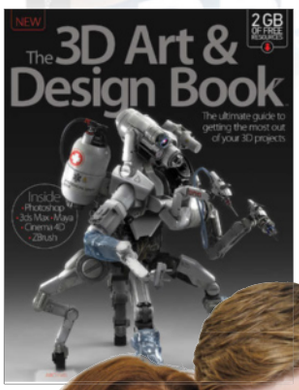
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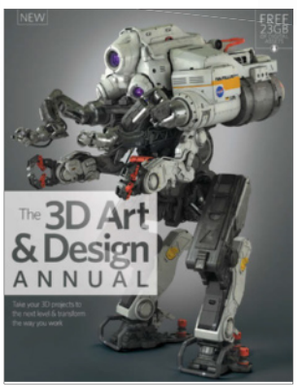

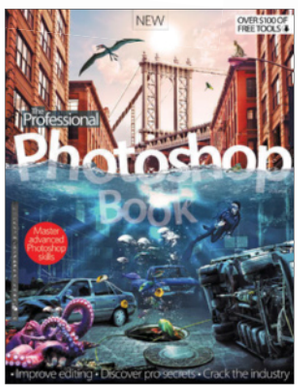
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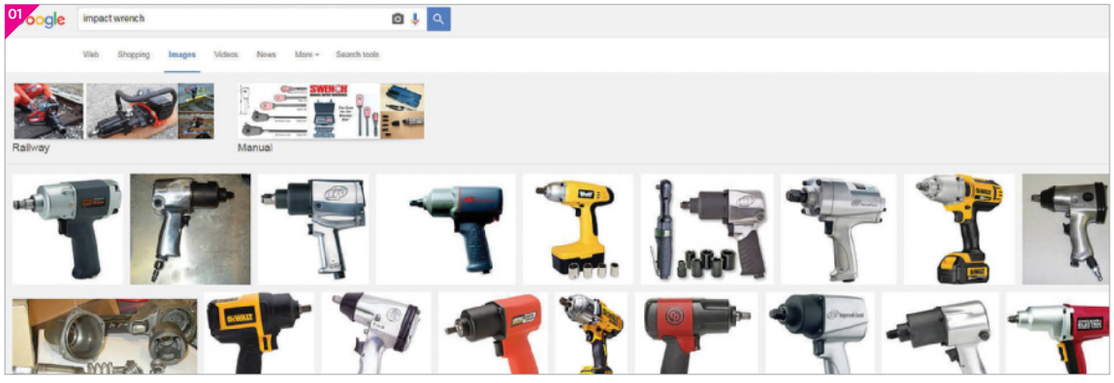
Construct a real-time videogame asset

Within the realm of videogames, often the beautifully rendered, expansive environments or fantastically realistic leading characters steal the show. But just as important, although sometimes overlooked, are the incredibly detailed tools, gadgets and props that also enjoy a considerable amount of screen time. Often a studio will break art tasks down into different departments, with dedicated environment, character, vehicle and prop teams. The aim of this tutorial is to outline the processes employed by an artist working on a highly detailed prop asset. A typical example might be the highly detailed AK-47 you hold as a character in a first-person shooter, or a mysterious, collectable artefact found in a lost tomb that the player can later view in detail. The subject of this tutorial is an impact wrench, or wheelgun as it's also known, which is a tool typically used by professional pit crews when changing tires.

With a solid and sturdy design, and plenty of interesting surface details and materials, this prop will provide many interesting opportunities to learn and refine your skills when trying to re-create it. This tutorial will identify each of the main steps involved in the pipeline before giving an outline of the processes required. Annotated images will also help guide you to completing each step before moving onto the next. Just as it is in the professional industry, it will be dependent on your own skill level and experience as to how long each step takes you to complete, and so with that in mind, try not to rush through this guide. Instead, take your time to learn, practise and, most importantly, enjoy the process.



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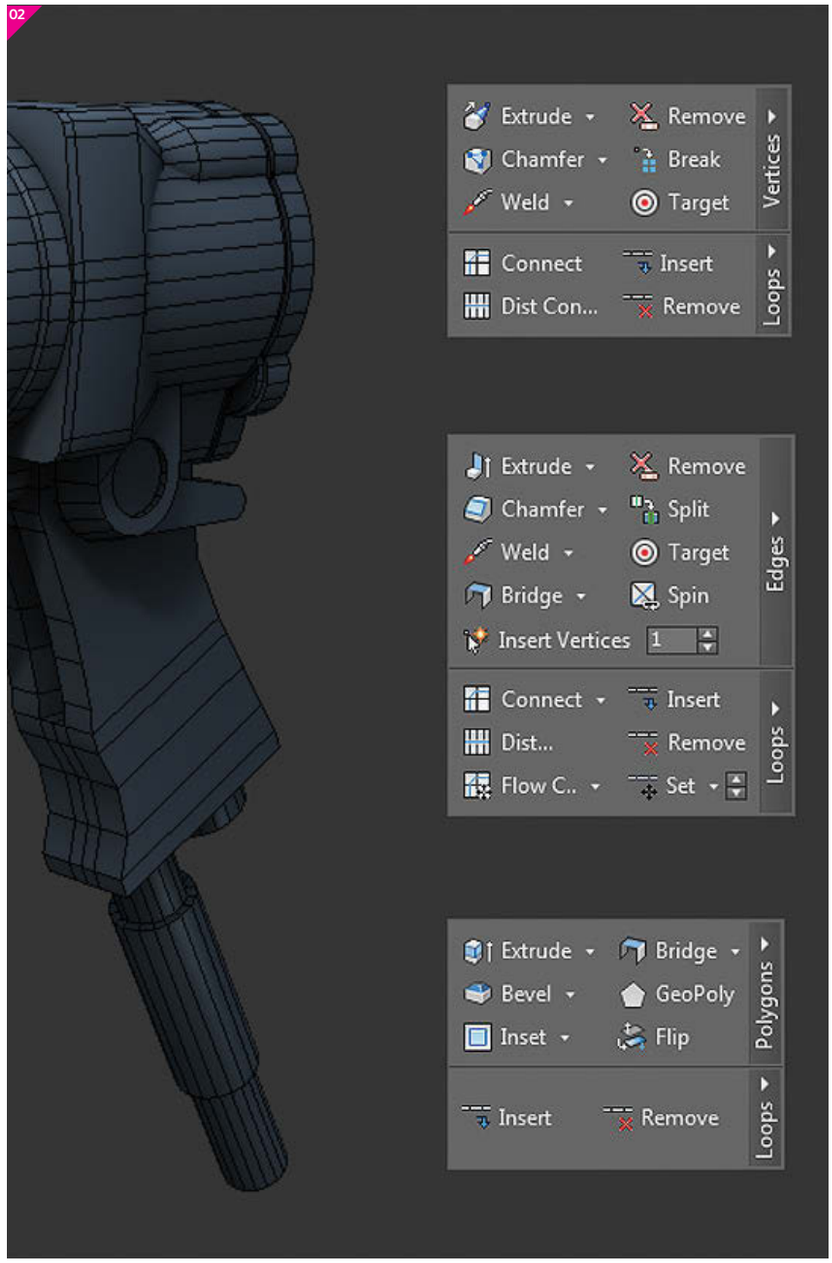
- Texture maps

01 Gather references Gathering suitable reference is one of the most important preliminary steps when beginning any project. It's important to not only develop a familiarity with the appearance of the item, but also to learn a little about its construction, use and function. This is important because the more you are able to learn about this object, the more informed your modelling and texturing choices will be. Using sites like Google, Pinterest and Flickr we'll collect images and information about each part of the impact wrench and create a mood board to help us generate ideas.

02 Create a blockout Creating what is referred to as a blockout mesh is an essential part of the modelling process; the aim of this step is to capture the rough proportions of the asset using simple primitive shapes and low detail meshes. At this stage keeping the meshes relatively simple will allow us to easily manipulate them. Using the basic modelling tools within the vertex, edge and polygon selection modes, edit the meshes with a focus on capturing the large masses of the object and their relation to one and others. With this done, we will no longer need to worry about general proportions in the next stage and we can focus more on details.

03 High-poly model We'll now move on to creating a detailed version of the asset that we'll later use to generate a normal map texture from. The type of modelling used at this stage is known as subdivision modelling: the workflow involves creating a mid-level mesh that accurately captures the silhouette and details of the subject, before applying the TurboSmooth Modifier within 3ds Max to smooth out all of the facetted polygons. The TurboSmooth Modifier works by subdividing each polygon once horizontally and once vertically, and smoothing the silhouette of the object in doing so. Unfortunately this can result in a loss of hard edges and so additional 'support loops' are required to control the effects of the smoothing. As you can see, adding a TurboSmooth to the model shown in figure A results in an overly smooth mesh as shown in figure B. However, with additional support loops added in figure C, the resulting TurboSmoothed mesh maintains its silhouette and tighter details as shown in figure D. With this in mind, it's now simply a matter of modelling each part of the object in turn. This can take some time to do, but the quality of the final asset is often determined by the time and effort that is spent at this stage.

02



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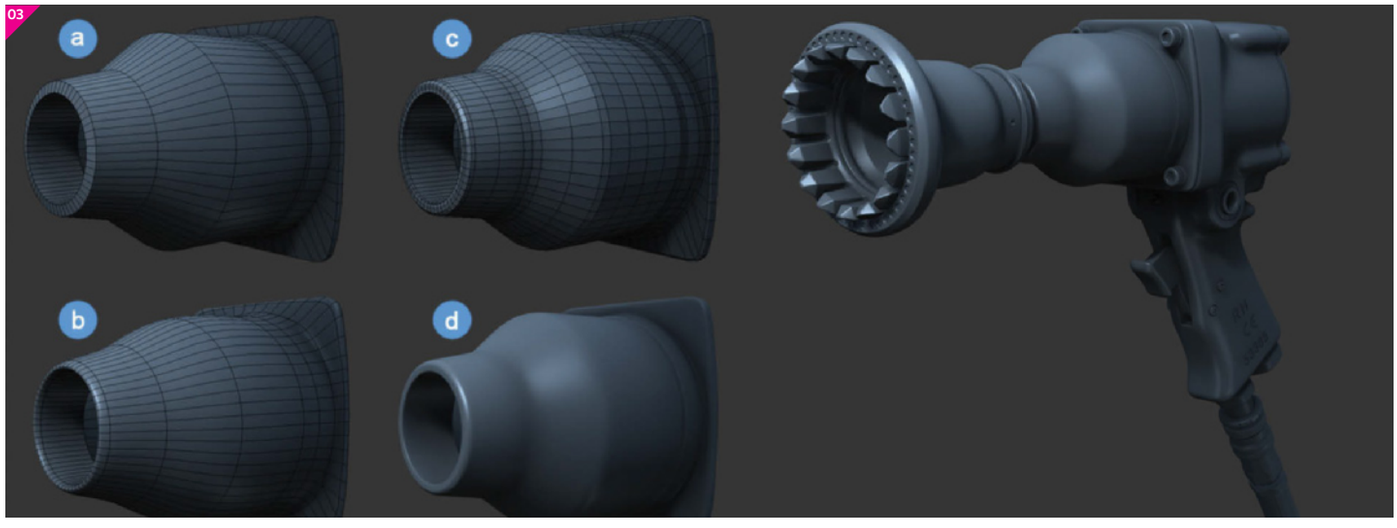
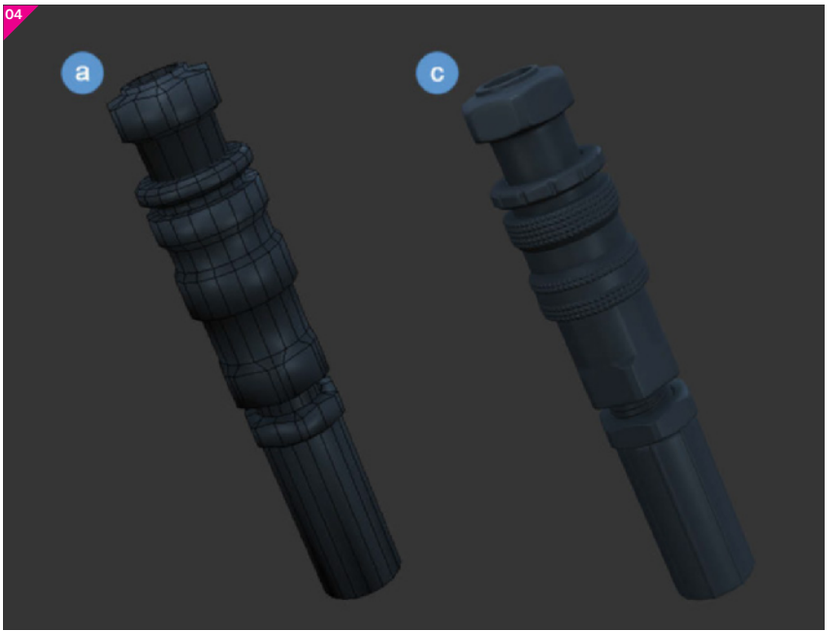


04 Low-poly model Now it's time to create the low-poly version of the asset. This model will need to adhere to a strict polygon limit and will also need UVs to enable us to generate normal map information from our previously created high-poly mesh. Creating a duplicate of the high-poly mesh, we'll now simply begin to remove some support loop edges, cylinder segments and fine details like modelled text and small indents until the low-poly model is around 12,000-13,000 triangles. Figure A and B show examples of the low- and high-poly model for comparative purposes.

05 UV unwrapping In order to generate a normal map, the low-poly mesh will need UVs. These UVs must fit within the 0-1 space within the UV Unwrap Editor and must not overlap at all. To make the process of unwrapping easier, you can use a free plugin called TexTools, though the standard 3ds Max unwrapping tools are also sufficient for the task. One very useful function that TexTools has is the 'Smoothing Groups from UV shells' option found under the Tool menu. Clicking this button when our UVs are finished will apply smoothing groups to our low-poly mesh that will ensure the normal map that is generated works well with the mesh. Figure A and B show the final UV layout and the text tools dialog boxes.

06 Texture maps with xNormal With the high- and low-poly models exported, you're now ready to generate the normal map texture as well as ambient occlusion and height maps – these texture maps will be integral to the texturing process covered in the next step. As well as being free, xNormal is extremely easy to use. First add high- and low-poly mesh SBM files to the corresponding tabs labelled on the right-hand side of the program interface. In the Low Poly tab ensure Use Cage is ticked and in the Baking options tab select the Normal map option, choose an Output file location and hit Generate Maps. Repeat this process to generate an ambient occlusion map and a high-poly vertex colour map.

04



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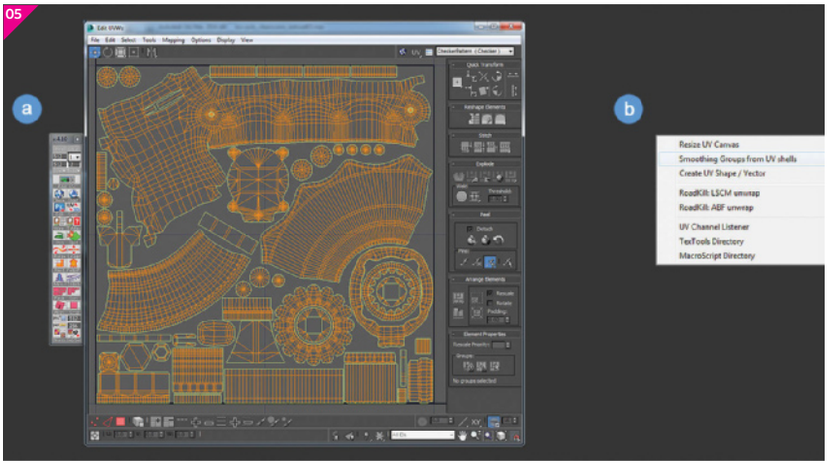

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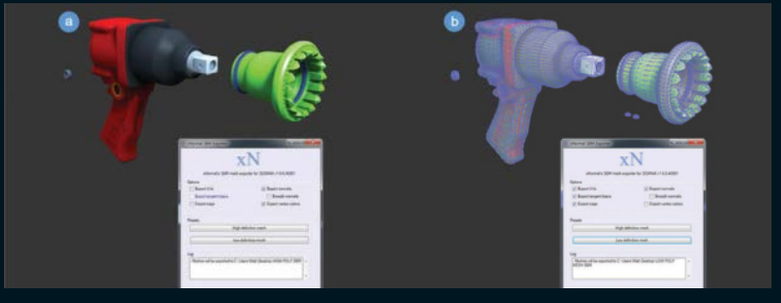
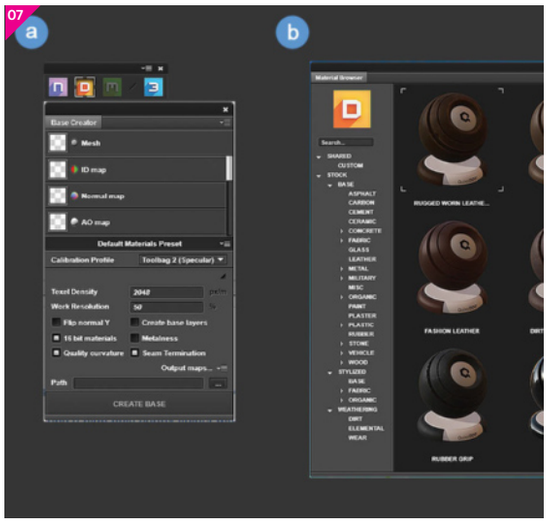
> UVs must fit within the 0-1 space within the UV Unwrap Editor and must not overlap at all



Prepare meshes for export with xNormal

We'll be using a free program called xNormal to generate a normal and ambient occlusion map, but first let's prepare the meshes for the program. For the high-poly mesh, space the meshes out a little and add a bright vertex paint modifier to each part that represents a different material, as shown in figure A. For the low-poly, again space out the parts so that they lie on top of their high-poly counterpart and then add an Edit Mesh modifier and a Projection modifier to the object. In the Projection modifier use the 'push' option to expand the cage so that it encompasses the high-poly model. With xNormal installed, you're now ready to export these two meshes as SBM files using the options shown in each corresponding dialog box.

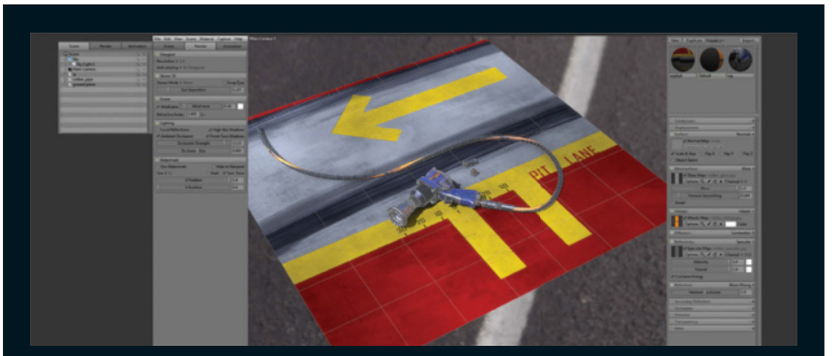
> A program like Quixel's DDO can make the texturing process dramatically more efficient



07 Texture using Photoshop and DDO In a production environment deadlines are critical, and using a program like Quixel's DDO can make the texturing process dramatically more efficient. Simply load textures and an OBJ of the low-poly mesh into the appropriate slots in the Base Creator window and set the options as shown in figure A. Pressing Create Base will now take us to the editor. Loading the 3D viewer, you can see a preview of the mesh and holding C will display the vertex colour ID map generated. Holding Shift and clicking on any of the colours will bring up the Material Browser window as shown in figure B, where you can select and apply materials to each part of the mesh.

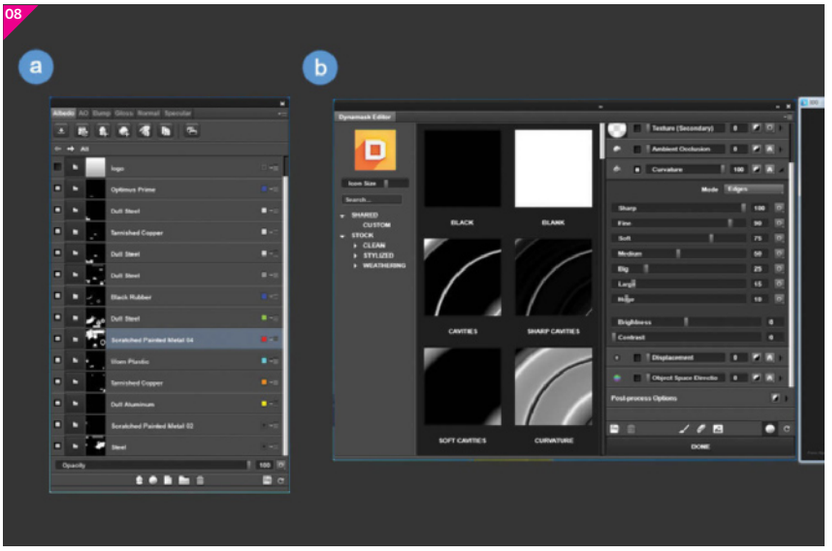
08 Fine-tune the textures in DDO With all basic material assignments made to the asset we can now begin to fine-tune them using DDO's built-in options. With each new material assignment a material group has been created in the layer tab shown in figure A. Clicking on the mask icon for a layer, a Fine Rust layer for example, brings up the Dynamask Editor shown in figure B. Within this editor you can either choose from a selection of masks to control how the rust is then applied to the asset and view the changes you make with the sliders in the 3D viewer. With a little time and patience, fine-tune all of the materials this way until you're happy with how the finished textures look.

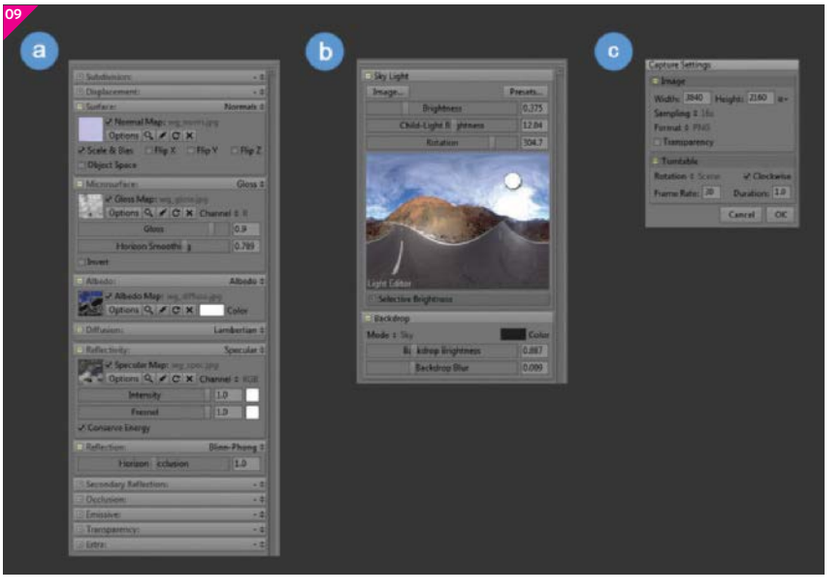
09 Presentation in Marmoset Toolbag Now that you're happy with the asset's appearance in the DDO viewer, use Marmoset Toolbag to capture a final render. Within Marmoset you can easily load the mesh and use the default shader and plug textures into their corresponding slots as shown in figure A. Using the Sky tab, you can choose from a number of HDRI maps for ambient light and by clicking on the Light Editor window, you can create an additional, shadow casting light as shown in figure B. Finally, you can set the Capture settings as shown in figure C to make a really large image that you can later downsize in Photoshop to fix any aliasing issues.



Presentation tips

While taking screenshots within Marmoset Toolbag, using the default HDRI backgrounds is a nice way to present the asset; we always like to add a little context to our work, in order to really sell the idea we're trying to present. In this case we'll present the final image as if the impact wrench has been left on the floor of a Formula 1 pit lane. This can be achieved with a simple textured plane and a few additional models, like a hose and some bolts to add a little interest. After capturing the image we add some subtle photographic filters and we're ready to call this project done!





MAYA, ILLUSTRATOR

Make a papercraft mask in Maya

This tutorial gives a stylised approach for modelling a 3D mask in Maya and Illustrator. You will learn to model a mask that looks like it has been hand made from paper. Sometimes it can be difficult to create curves and organic shapes in Maya, but this tutorial combines Illustrator's 'paths' with Maya to convert them to polygons. This is a chance to have fun without some technical limitations and create some cool-looking art.

Use the layers in Maya

It is really useful to make use of the layers in Maya; a lot of people forget that they even exist. On the right-hand side below the Channel Box editor under Display are the layers. You can toggle between which visability you want. V means visible, T means template and R will lock the item that's been added. Click on the layer with the items selected and then click 'Add selected objects'.

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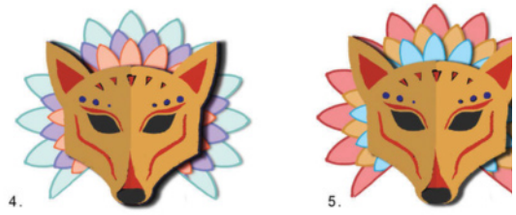
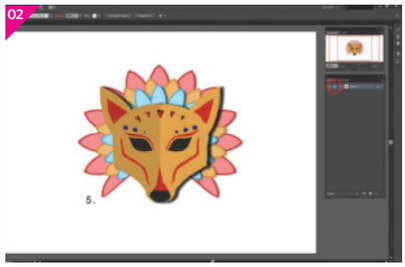
01

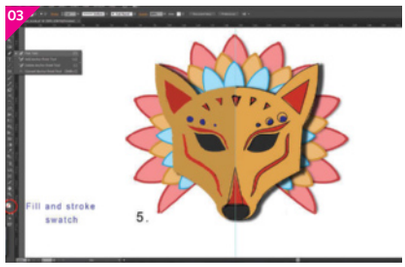


01 Sketch out a concept The first thing to do before any project is to draw some rough concepts out to plan your idea. To jump straight into a project without planning can make the design suffer and waste a lot of time. You could do some rough sketches in a sketchbook first then work them up in Photoshop to play with the concepts and colours. The looser the better, don't be afraid to try lots of variations. Make sure you have a solid design idea before you take it a step further.

02 Take the chosen design to Illustrator With your design chosen, it's time to tighten it up Illustrator. File>Place (name of image) into Illustrator. Make sure that you put the concept into a locked layer by clicking the empty box on the layer. It is also a good idea to run a ruler guide down the middle of the mask so that you can see it is symmetrical.

03 Vector the design Now use the pen tool to draw out the different sections. Try to use different layers for each different section to keep organised – it helps to imagine building up the layers in 3D. Make sure the pen is drawing the outline and not filling in the shapes. Check the fill swatch is on 'none' and the 'stroke' has a colour. Only draw half of the mask because you can flip it when it's drawn. Use the Convert Anchor point tool to alter the paths, switch between that and the Pen tool. Add or minus the points where you see fit.

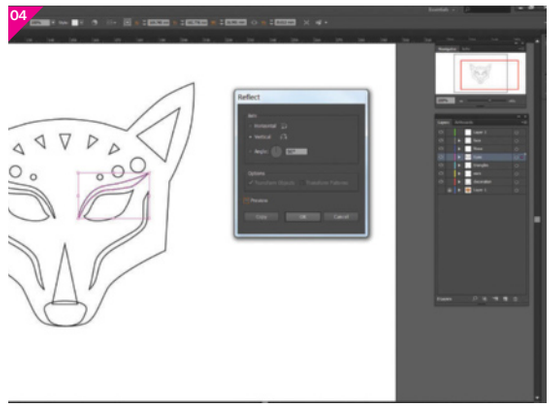


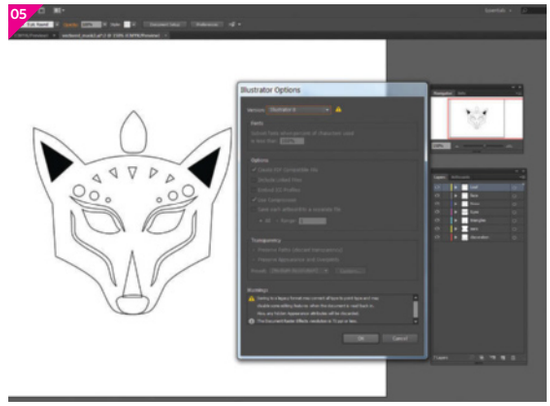


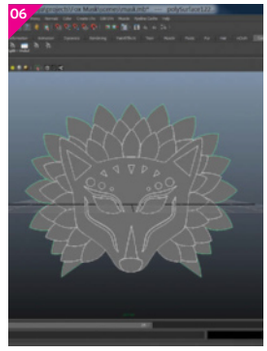
04 Flip the shapes When you have drawn half of the shapes, flip it to make it symmetrical. Just draw one leaf, as you can duplicate them later in Maya. Then you can copy and paste the shape, and select it by using Object>Transform>Reflect. Flip one object at a time now instead of multiple paths, as some may need tweaking. Make sure all the paths are closed by clicking Object>Path>Join, as Maya will struggle converting them into curves if they are open.

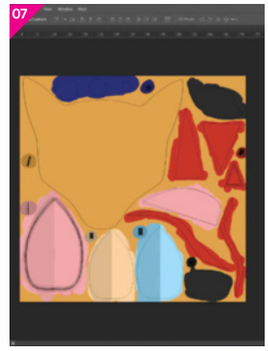
05 Export from Illustrator to Maya When you have your paths cleaned up and symmetrical it's time to export the mask to Maya. Make sure you delete anything that is no longer needed in the layers – it's advisable to save this as a different file just in case. Make sure all the paths are closed and that there are no duplicate curves. Now go to File>Save As and name the document. Change the Illustrator version to Illustrator 8.

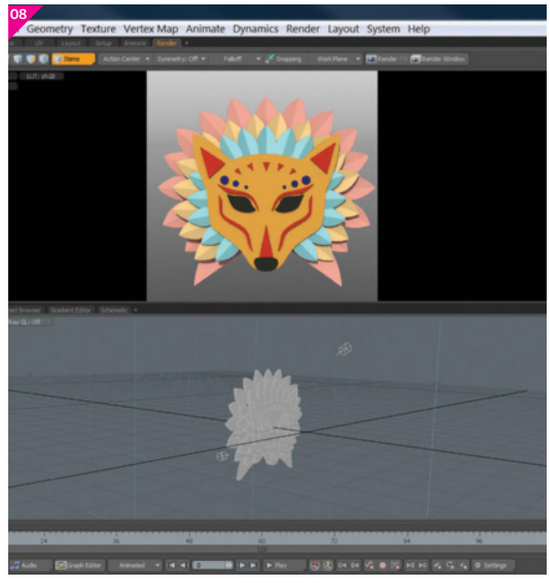
06 Curves to Polygons Open up Maya and go to Create>Adobe Illustrator>Object>Select Bevel>Create to convert the curves to polygons. If there are any issues it is because of unclosed paths or duplicate curves. The path might not be dead centre at this point, so just go to Modify>Centre Pivot and place it in the middle of the grid. Click on the mesh with Modify>Separate and then you can move the polygons forwards/backwards until you are happy with the placement. Move the leaf at the top of the mask in the middle then duplicate it and rotate it around the mask. Use the shortcut Ctrl/Cmd+D for this. Duplicate half, then with all the leaves selected click on Edit>Group (this will make it easier to transform). Then use Mesh>Mirror Geometry for the other side. Repeat for the next two leaf layers but make the leaves that are behind bigger.







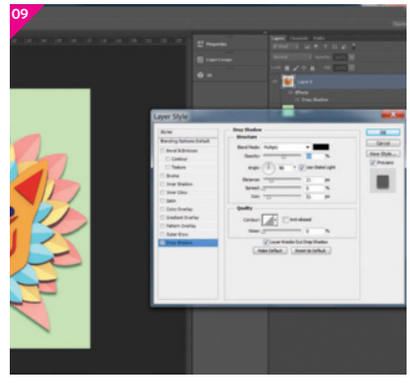




07 UV mapping/texturing Now select an item and go to Polygon>Create UVs>Planar Map. For this project the texturing will be block colouring so you can cheat a little and just planar map the front faces and hide the side faces (by shrinking the UVs really small). All of the items are separate and will be block colours so you won't see any seams. A nice time-saver is to transfer UV sets to other polygons that are the same mesh, like the leaves for example. In the Polygon menu select a polygon (one that's UV mapped), select another polygon and go to Mesh>Transfer attributes. When you are happy with your UV map, take a UV snapshot and take it into Photoshop to texture.

08 Lighting/rendering Use a directional light and maybe the odd point light to light up the front. Render face on like a mask and use a square render size about 2048x2048. You can either render in Maya or use an external program, whichever you feel the most comfortable with. We will render in MODO with a setup of a simple directional light front on and a light behind to give it some back lighting. Render it out as a PNG so that it's an alpha (see-through).

09 Photoshop editing When you have your rendered image, take it into Photoshop. Feel free to alter the brightness/contrast and the colour levels until you're happy with the colours. Choose a complementary background to go underneath the mask. Then use the Rectangular Marquee tool and select half of the mask, dead centre. Go to Image>Adjustments>Brightness/Contrast and bring the brightness down on one side. This will give the illusion that the mask comes to a point in the middle. Then select the mask layer and put a drop shadow underneath just to give it a bit more depth. Repeat for the ears so that they look creased. The last finishing touch to give an authentic paper look is to add a texture on top. Search the internet for a sugar paper texture or something similar, put the layer on overlay/soft light and play around with the opacity.



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Chillblast Fusion Render OC M4000

Chillblast hits the right balance for general-purpose rendering with a six-core Intel processor and Nvidia Quadro M4000 GPU

In astronomy, a planet is said to exist in a 'Goldilocks Zone' if it's just the right distance from its parent star, with mild surface temperatures that ensure water is in a liquid state. Not too hot, not too cold.

The same idea could loosely apply to the sweet spot for general-purpose 3D workstation configurations. You want a processor with enough CPU cores for great performance in multithreaded rendering applications like 3ds Max, but not at the expense of clock speed for single-threaded applications that (still) make up the bulk of all computer software. You want a powerful GPU for tasks that are accelerated by CUDA or OpenCL, but at a reasonable budget.

Chillblast's Fusion Render OC has such a specification, one we would consider to be perfectly suited for mid-range rendering.

It has an Intel Haswell-E Core i7-5820K processor – a six-core chip, so you're getting roughly a 50 per cent performance improvement in multithreaded applications over standard quad-core processors. And this chip has been overclocked to 4.2GHz, a mighty increase over its 3.3GHz default speed, all thanks to the Corsair Hydro H100i GTX all-in-one liquid cooler.

On top of this, it's sporting Nvidia's swanky new Quadro M4000 8GB Maxwell-based graphics card, which we reviewed in issue 87, concluding it offered a lot of bang for your buck. To recap, Nvidia's new generation of Quadros sticks to the same 28nm process of the older Kepler models, rearranging the furniture for a strong boost to some areas of 3D performance, especially OpenCL.

Topping off these main components there's 32GB worth of DDR4 memory; an Asus X99-A motherboard; a 512GB Samsung SM951 PCI-Express SSD that is capable of some utterly insane performance; a 2TB hard disk; 650 watt power supply and finally Windows 10 Professional.

Chillblast has gone for a Fractal Design Define R5 chassis, with an internal build that's as well built and tidy as you would expect from a major PC vendor, with no messy cabling to obscure access to the internals.

It'll set you back £2,500, which is hardly pocket change, but expensive hardware is an unfortunate aspect of 3D design, and when you consider what you're getting, it works out to be fantastic value. Although no single component here is the absolute best in class, if you want a workstation with a more powerful eight-core processor and a beefier GPU you'll need to dig deep into your wallet.

What's really important is that with modern hardware and lower prices, you're getting the same level of rendering performance from a £2,500 machine that would have set you back £4,000 a year ago.

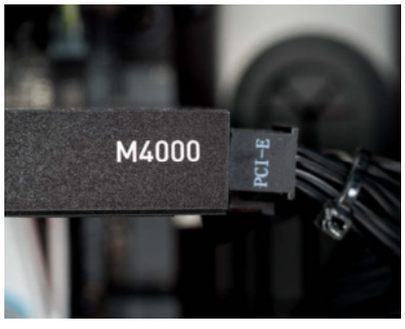
The proof is in the benchmark results. The Fusion Render OC chewed through the 1080p Underwater 3ds Max test in 9 minutes 11 seconds. This result isn't quite as quick as some systems we've tested with eight or more processor cores, but still a lot faster than any system with a quad-core chip, including Intel's latest Core i7-6700K Skylake quad-core processor.

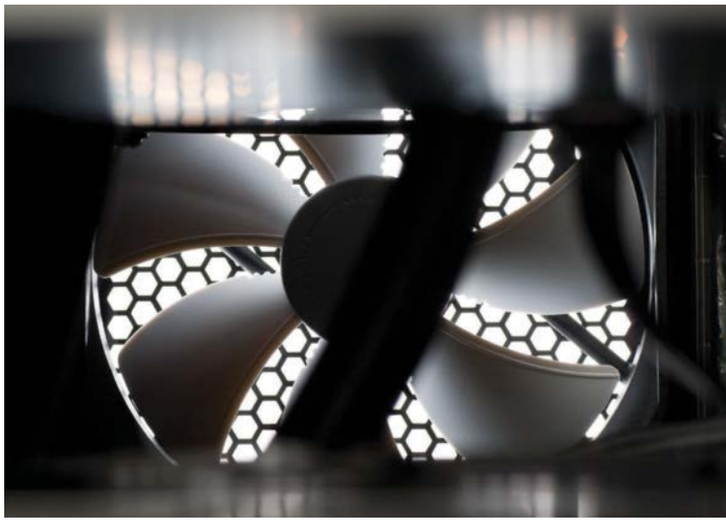
In SPECviewperf the M4000 roughly matched the performance we recorded in our test system. It's a £750 GPU, but it matches or even beats the 3D performance that the previous-generation Kepler-based Quadro K5200 managed, which cost £1,500 – yet another boost to the all-round value of the Chillblast Fusion Render OC.

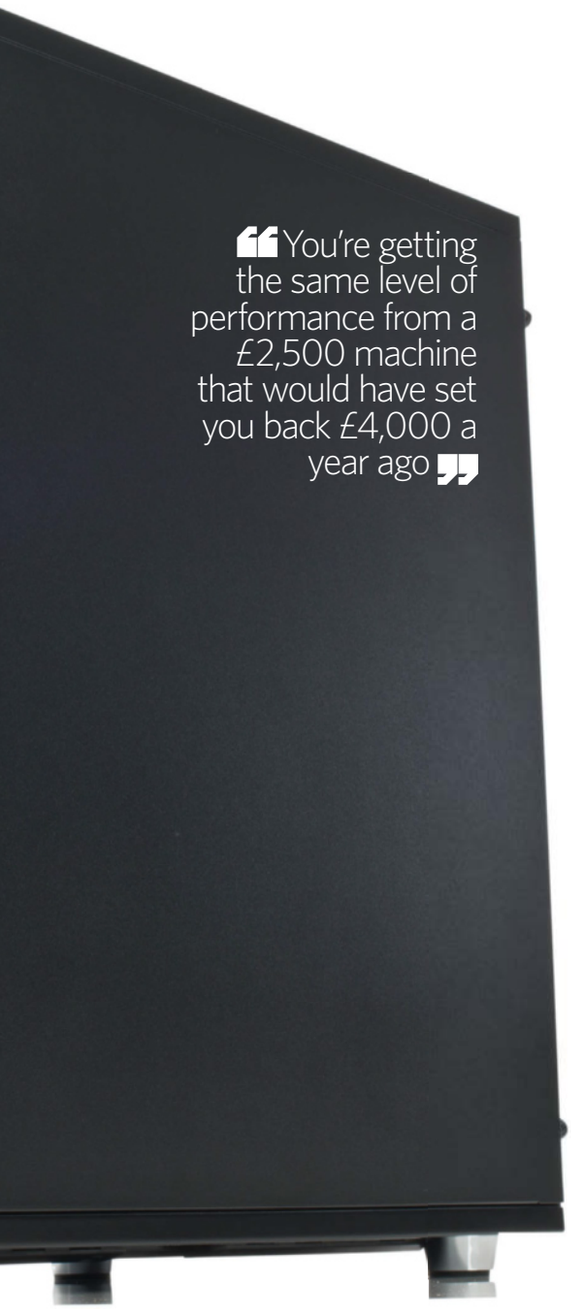
Meanwhile, in Cinebench, we recorded a score in the multithreaded CPU test of 145.14 – again a result that doesn't beat the eight-core Xeon systems we've reviewed, but it's a slim gap for far less cash.

The only conclusion is that the Fusion Render OC offers the best relative value of any system we've reviewed, given its capability. It will get by just fine with even the most detailed rendering jobs, offering much better performance than a quad-core workstation, while remaining within most realistic budgets.

Orestis Bastounis







> You're getting the same level of performance from a £2,500 machine that would have set you back £4,000 a year ago

MAIN The PCI-Express Samsung SM951 SSD can manage sequential read speeds above 2000MB/sec

BOTTOM LEFT The Nvidia Quadro M4000 uses the new Maxwell architecture

BOTTOM MIDDLE A high-performance all-in-one liquid cooler makes all the difference to achieving a stable overclock

BOTTOM RIGHT An overclocked six-core processor offers a formidable mix of single and multithreaded performance

BELOW The Fusion Render runs extremely quietly, even when put under load

Essential info

Price	£2,500
Website	chillblast.com
CPU	Intel Core i7-5820K (4.2GHz)
GPU	Nvidia Quadro M4000
RAM	32GB DDR4
SSD	Samsung SM951
Cooler	Corsair H100i

Summary

★★★★★ **Features**
★★★★☆ **Performance**
★★★½☆ **Design**
★★★★★ **Value for money**

Verdict ★★★★½

The performance of last year's typical £4,000 workstation can now be had for £2,500

Technique focus

Incredible 3D artists take us behind their artwork

DETAILING Most of the parts were modelled from a cube or cylinder. After modelling the gun in Maya, I took it into ZBrush where I added mid-level details. All of the fine details were added to the normal map during texturing in Substance Painter. This workflow helped me to work efficiently without having to waste time building details into the model.

Martin Bosak
martinbosak.com
Martin is a CG artist located in Edinburgh, with three years of experience in the games industry

Software Maya, ZBrush, Substance Painter, Marmoset Toolbag

Salamander Crossbow, 2015

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The Hub

The inside guide to industry news, VFX studios, expert opinions and the 3D community

> Before we say 'yeah 100 per cent sure we will do 2016', this time I want everything done in a different way so we can [do] a better job

Andres Luis, co-founder of Trojan Horse was a Unicorn

088 Community news

Trojan Horse was a Unicorn

After a few concerns over the popular festival's future, we find out whether THU will return in 2016. Plus, we revisit bluegfx expo

090 Industry news

NUKE 10

The Foundry reveals plans to launch a new rendition of its compositing solution in 2016, plus Poser goes PBR and Kinect mocap levels up

092 Advertorial

The VFX Festival

In a sponsored message, Escape Studios, part of Pearson College London, reveals why its 2016 festival line-up is so special

094 Social

Readers' Gallery

The latest images created by the **3dartistonline.com** community

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Content from THU TV such as 'Inside the industry', 'Speed Sculpting Lab' and 'Sketchbook' were premiered at the meet up

Is the end in sight for Trojan Horse?

The tribe gathers at Gnomon's Hollywood campus in LA to hear about the future of Trojan Horse was a Unicorn

For the most part, due to severe financial concerns, the decision about whether or not there will be another chapter was left up in the air during the closing ceremony of Trojan Horse was a Unicorn 2015 (THU) – the highly regarded digital arts festival held annually in Troia, Portugal. But after a deliberation period, THU's cofounder Andres Luis and ambassador Scott Ross have now reached a decision... well, sort of. "It's not sure that we will do 2016," revealed Luis at the THU meetup held at Gnomon HQ in LA. The meetup was a chance for the team to discuss the problems THU faces and unveil their intentions for the festival, THU TV and what's next for the tribe.

"To put on THU is somewhere in the neighbourhood of €1 million," Scott revealed while discussing the financial problems. Hampered by the decision to keep the family feeling of the event, which means keeping ticket numbers very limited, they have opted to look at more sponsors as well as asking existing sponsors to dig deeper. "If we do 2016, I was convinced to prepare what should be the next step, I spent the last two months organising what should be the next generation of THU. Having more sponsors brings a responsibility of not killing the vibe," Luis surmised.

Another source of funding, THU TV was aimed at people who may not have tickets and couldn't participate, and to expand the tribe worldwide but keep the event intimate. "If we do the event again, THU TV will have some upgrades" Luis said. Referred to as THU TV version 2, it will contain exclusive new shows being added over the remainder of the year with over 40 hours of content split into 12 different shows. This will include shows like 'Inside the Industry', interviewing recruiters asking them what they are looking for; 'Sketchbook', looking inside artists' sketchbooks; and 'Speed sculpting lab', comprising timed modelling battles between artists. Scott explained, "The concept of THU TV is now moving in the direction of being like a broadcast station; it will have select programming directed at your interests and desires from a creative and inspirational point of view."

The event is still being planned, but tickets go on sale 2 January and will continue to be capped at 500 tribe members. The price will increase €100 to €600 plus taxes. No early bird tickets will be available but there will be flexible payment plans such as a monthly plan. The pioneers, the people who went to the first event (THU 2013), will be able to purchase tickets for €400 plus taxes. "Before we say 'yeah 100 per cent sure we will do 2016', this time I want

> It will happen in September 2016, but we don't know the venue and we are hoping we get the support necessary
>
> **Scott Ross, THU ambassador**

THU TV version 2 is a new concept from the Trojan Horse was a Unicorn festival

everything done in a different way so we can [do] a better job," said Luis.

A new location is also on the cards "We know that we will be in Europe, that's for sure," Luis revealed. "There's a lot of reasons we want to continue to do it in Tróia – it's a great location. But I have to be honest with you, Portugal has really turned the other cheek – they have not been supportive of the event," Ross confirmed.

With sponsorship deals still being negotiated, and the potential of THU TV in the balance, the event's future still remains optimistic, as Ross explained. "Assuming everything works the way we hope it's going to work with sponsors, and assuming the tribe responds with ponying up an extra €100 for tickets, it will happen in September 2016. But we don't know the venue and we are hoping we get the support necessary. The reason we are selling tickets in January is there's a need for cash flow. If the event does not happen we will return the money."

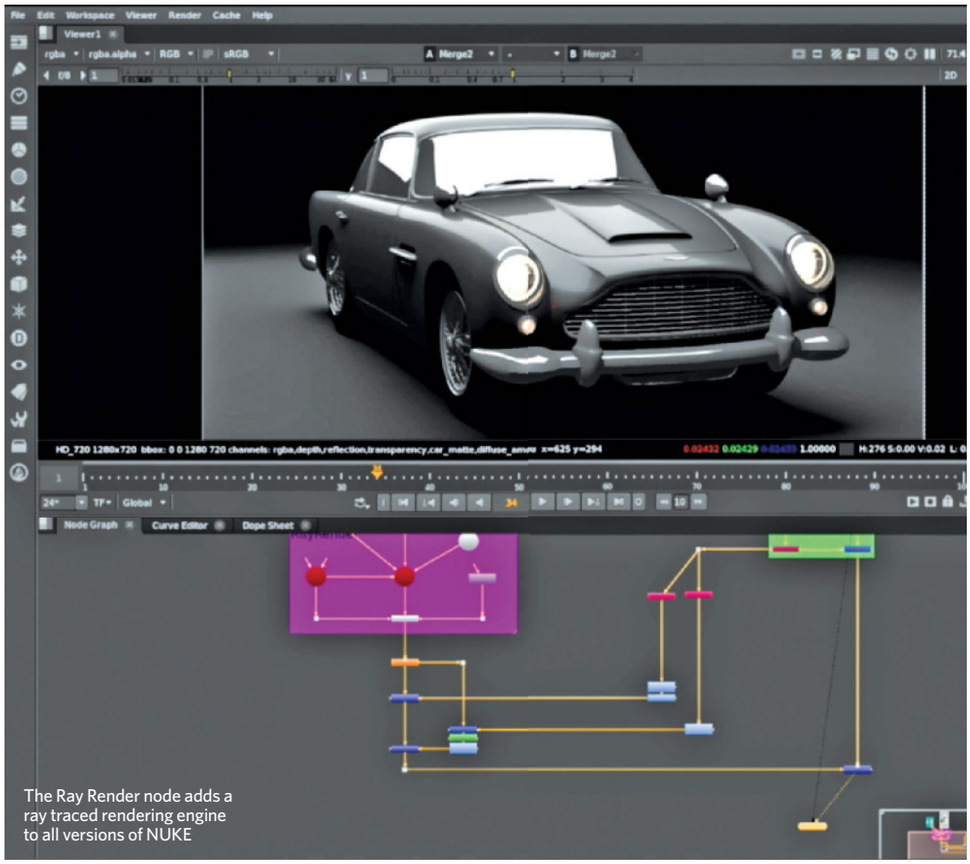
Autodesk's Alex Horst gave talks on the latest design animation workflows and procedural workflows with 3ds Max

bluegfx expo 2015

The expo impresses yet again with a host of professional talks

This year's sixth annual bluegfx expo was held at the Coin Street Centre in South Bank, London. "We couldn't be happier with how the day went, with over 200 visitors enjoying talks, presentations, demonstrations and informal consultations with leading designers and manufacturers from the world of 3D design and entertainment software," said Jo Calverly of bluegfx. "There were talks from some of the most exciting, innovative creative studios out there including Hamilton+Kidd, Squint/Opera, Blue-Zoo, Framestore and MPC. Stuart Penn from Framestore gave insight into some of the complex VFX sequences used in the making of Warner Bros' *Pan*, and Marco Romeo talked about the work performed for the rigging of Arnold Schwarzenegger in *Terminator Genisys*."

There were also a range of product presentations at the expo, including 3ds Max, Maya, Shotgun and Stingray from Autodesk; V-Ray from Chaos Group; RealFlow from Next Limit; Adobe CC and ZBrush. "The bluegfx expo was a great day – there was a fantastic mix of presentations from design studios and manufacturers, as well as product demonstrations. The event was seamlessly run and the bluegfx team were excellent hosts. I'll look forward to attending next year's expo!" said Lee Brown, director at Valkyr Media Ltd.



The Ray Render node adds a ray traced rendering engine to all versions of NUKE

NUKE 10 for 2016

Slated for release early next year, the focus is on stability, bug fixes and industry standard updates

The upcoming release of NUKE 10 brings with it ray traced rendering directly into NUKE's compositing environment via the new Ray Render node. It displays in a Scanline format and has a lower memory footprint, improved motion blur and shadows, point light shadow output, faster non-linear spherical projection and extended support for reflections and ambient occlusion.

NUKE STUDIO enhancements

Timeline improvements include a new Chroma Keyer for pulling both blue and green screen, core and soft mattes in real time with Despill Parameters for corrections, audio scrubbing to more easily match sound to footage, Soft Effects for the Color Correct node, more stable playback, swifter transcoding and faster QuickTime creation.

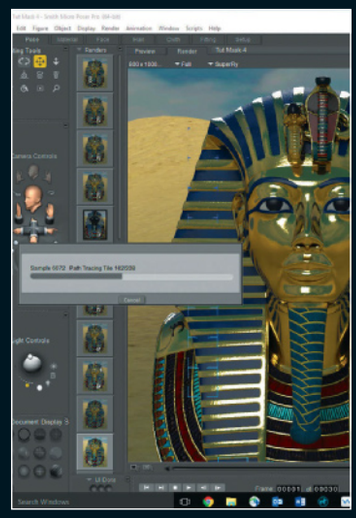
An overhaul of the RotoPaint node promises more stability and, in an effort to remove existing bottlenecks, enables more paint and clone strokes, letting you do more work inside just one node rather than having to use several nodes. The new Smart Paint toolset for NUKE X is a group of nodes that provide new workflows for adding textures and plates to image sequences using motion vectors that you can generate. It is tailored to simplify any cleanup and beauty work, which are typically laborious to do.

Some of the core compositing enhancements implemented by The Foundry include changes to the way NUKE's localisation works, and a more informative user interface. Speed improvements take advantage of Nvidia GPU support, enabling you to use two GPUs. There is also AMD support for newer MacBook Pro laptops as well as a GPU-driven vector blur for faster processing. NUKE STUDIO will enjoy timeline improvements (see left).

Poser release adopts PBR

Version 11 and version Pro 11 receive SuperFly renderer and new features

The visual quality of your work is set to improve with the introduction of physically based shading and rendering into both new Poser flavours. SuperFly is built on Blender's Cycles render engine, and is compatible with existing FireFly materials and the new SuperFly material system. The Pro version supports Nvidia CUDA GPU-assisted rendering. For graphic novel and anime artists, the Comic Book Preview mode now exists in one panel and sports automatically generated OpenGL ink lines, which you can then adjust the weight of and animate. A welcome dose of workflow enhancements (some Pro only) include adaptive rigging using Morph Dependent Joint Centres, smooth weight painting, Morph Target options at subdivision level, Alembic export, game dev features for asset creation with FBX import and export, and Windows Kinect support. Area lights with soft shadows, caustics, volumetric materials and layered materials for adding tattoos or scars have also been added to the new release.



Poser 11 has been upgraded with an integrated physically-based rendering solution

HAVE YOU HEARD? Apple was behind the mysterious acquisition of real-time motion capture technology firm Faceshift

Reallusion upgrades Kinect Mocap plugin

Real-time HD Kinect plugin for Xbox One couples with iClone 6 Pro to provide a mocap solution

Building on the success of its original Kinect mocap plugin for Xbox 360 and Windows, Reallusion has released an HD Xbox One version. When used with iClone 6 Pro it turns your Xbox One into a mocap studio without needing a marker suit. After the initial capture session you can then use iClone's motion editing toolset, which includes HumanIK and motion layering, to adjust your captures before exporting characters and motions into game engines or other 3D applications in FBX format. New features include 1080p camera with increased field of view, additional trackable skeleton joints, unparalleled tracking accuracy and improved 3D visualisation for better floor and feet contact.

PlayblastVR 1.0 for Softimage

New pre-vis renderer creates hardware rendered panoramic 360-degree images using OpenGL

With PlayblastVR, by Dover Studios co-founder Andrew Hazelden, you can create immersive hardware based pre-vis renderings of Softimage scenes in 14 different panorama formats. Scene elements such as animated polygon and NURBS geometry, lights, ice, hair and fur, cloth sims and procedurally generated shading networks are all supported. Completed sequences can be sent to Oculus Rift or viewed using standard playback tools. Direct panoramic rendering output to YouTube 360 and Facebook 360 video with automatic metadata embedding, and to Google Photo Sphere is supported.

Square Enix gets RunTime licence

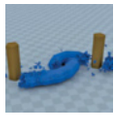
The game developer signs a licence agreement to use IKinema's RunTime

IKinema has expended its Japanese presence by licensing Square Enix its award-winning flagship middleware RunTime, which lets studios procedurally animate characters and multi-limbed creatures of any shape or size during gameplay, resulting in characters that respond to the game world around them with 100 per cent accuracy and more natural and life-like movement. "IKinema's skill in delivering realism and believability in procedural animation is particularly suited to game development," said IKinema founder and CEO Alexandre Pechev. The technology lets developers apply universal animation standards to multi-platform titles from mobile games through to triple-A titles, and will be used in upcoming games.

Square Enix has released titles including *Final Fantasy, Dragon Quest* and *Tomb Raider*

Software shorts

Bringing you the lowdown on product updates and launches



BulletFX 3.0

A raft of new features have been included in AlphaVFX's Bullet 3.0. The GPU-accelerated multiphysics engine plugin for 3ds Max gains GPU FLIP fluids with a foam solver, an OpenVDB fluid mesher, a GPU granular solver, a differential FEM solver that includes a muscle solver and tetrahedralise solver, BGEO caching and more. BulletFX will be $260.

SketchUp 2016

Workflow improvements form the emphasis of the 2016 release. There's new functionality to the inference engine; the texture library has been overhauled and expanded; and LayOut has a new C API, multilayer groups and more. Trimble Connect is now integrated for pro users too. The non-commercial version is free, while the pro version is $695.

HitFilm 4 Pro

HitFilm 4 Pro introduces Normal and Bump mapping, plus Cook-Torrance shading, dynamic reflections, diffuse lighting and global AO that casts between different 3D layer types. There's also Alembic support and a new animation value graph plus particle system and editing updates. Boris FX's titling plugin, 3D Objects, comes included for free. HitFilm4 Pro will be $349.

DID YOU KNOW? Evermotion is holding an arch-vis contest. The entry deadline for the competition is 26 January

The VFX Festival 2016

Escape Studios' annual CG celebration returns in 2016 with a star-studded line-up of games, animation and VFX guest speakers

Brought to you by Escape Studios, part of Pearson College London, the VFX Festival 2016 will feature speakers from the world's most recognised studios across VFX, animation and games; it will delve into and discuss the convergence that is taking place across the creative industries. The festival will consider how the different disciplines are coming together and the opportunities that have been created as a result.

The Mill will kick-off the festival, presenting on Augmented Reality, Virtual Reality and discussing the Google ATAP Project, with Hamilton+Kidd providing a supporting presentation on Virtual Reality and 360-degree technologies.

MPC will show how the innovative EarthToMars tool created for *The Martian* (Twentieth Century Fox, Ridley Scott) combined innovative technology and the perfect location shoot to develop photoreal environments. The CG team enhanced the desert-scape adding additional rocks, craters and mountain ranges to construct a believable Mars world, here on Earth.

Further presentations will come from Rushes who will be discussing the amazing motion graphics featured in the new James Bond film *Spectre*. World-renowned animation studio Aardman will be talking about all things animation. Lastly, Climax Studios will be representing the world of gaming, talking about its contribution to the very successful games series *Assassin's Creed*.

Industry convergence is creating brand new challenges and opportunities across all disciplines, where games artists are helping filmmakers to create virtual worlds for 360-degree storytelling.

VFX artists are helping developers create convincing and immersive environments, and motion graphics artists are adding layers of information to create rich visual experiences.

The VFX Festival, created by Escape Studios, part of Pearson College London, will run from 23-25 February 2016 at London's O2, bringing the best in VFX, games, animation and motion graphics to industry professionals and anyone that might be considering a career in the creative industries.

Tickets for The VFX Festival 2016 are available to buy now from www.thevfxfestival.com.

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TUESDAY 23 FEBRUARY

VFX, Games & Animation Newcomers

HEADLINER:

- The Mill – Feature on: AR and VR, Google ATAP Project
- Feature presentation – Hamilton+Kidd (VR and 360)

WEDNESDAY 24 FEBRUARY

VFX, Games & Animation Enthusiasts

HEADLINER:

- MPC – VFX Feature on: "The Martian"

FEATURE PRESENTATIONS:

- Rushes (Motion Graphics Feature on "Spectre")
- Aardman (Animation)
- Climax Studios (Game Art)

THURSDAY 25 FEBRUARY

VFX, Games & Animation Professionals

- Career and recruitment talks by a range of leading studios

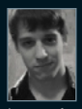
Images of the month

These are the 3D projects that have been awarded 'Image of the week' on 3DArtistOnline.com in the last month

01 Love Bugs
by Jarrod Mark Hasenjager
3DA username Hasenjager
Jarrod says: "A moment in time shared by two special creatures, reminding us that the most beautiful thing we can experience is the mysterious."
We say: *Jarrod's image is extremely charming, and on close inspection is extremely detailed. We're big fans of the lighting and composition of this piece – great work.*

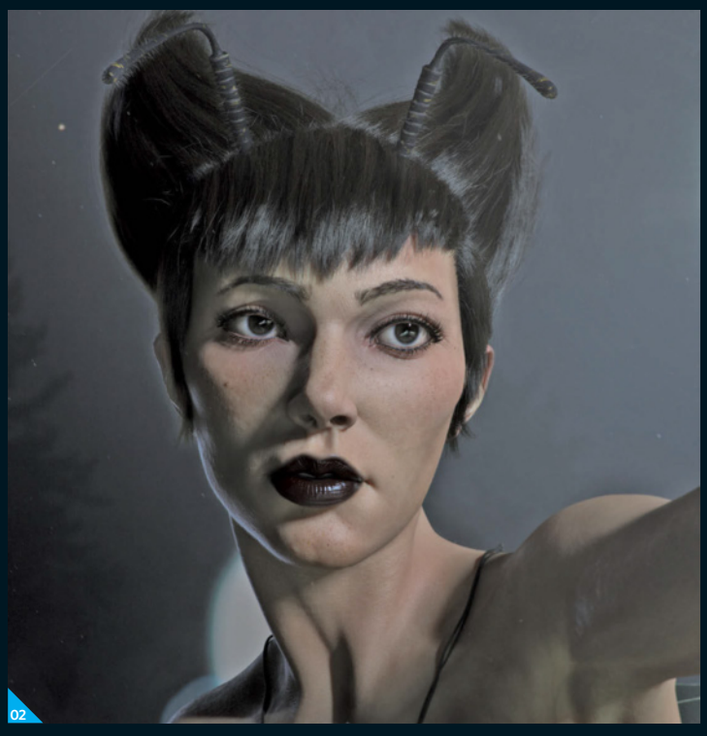
02 QBee Redesign
by Carlos Sastre Antoranz
3DA username C1-Workshop
Carlos says: "This is my Qbee redesign. I used 3ds Max, V-Ray, Photoshop and ZBrush. I've tried to give her a realistic look. It was a great exercise in anatomy and shading and I learnt a lot during the process, but I'm still far away from avoiding the uncanny valley!"
We say: *Carlos' image really feels like it wants to tell a story, which is a huge bonus in our book. The hair and also the skin shaders are very, very good here. Well done!*

03 Matilda
by Francis-Xavier Martins
3DA username Polyjunky
Francis-Xavier says: "I made Matilda for Halloween, based on a Max Grecke concept. I really like his shape language so after sculpting, I decided to add proper shaders and render it in Maya."
We say: *This is a great bit of character work and is clearly based on a wonderful concept. Slightly simpler cartoon styles actually aren't easy to pull off, but you wouldn't think that from having seen Francis-Xavier's excellent work.*



04 Extraction
by Anton Podvalny
3DA username Henrixon
Anton says: "I've always been a fan of heavy industrial science fiction. I wanted to make an atmospheric image of a laboratory where specialised robots extract some rare material mined outside the Earth."
We say: *We really admire Anton's use of materials here, especially on the perspex-looking orb in the centre of the room and the matte metal surfaces on the robotic arms.*

01



02

Cobra **by Grigorii Kliver**

3DA username AirJ

Grigorii says: "Hi everyone. This model was created specifically for a car competition, which took place on one of the 3D resource sites. For this I used 3ds Max, Corona, HDR Light Studio, ZBrush and Photoshop."

We say: *Great choice of car from Grigorii here, as the Cobra's curved body makes for interesting viewing. He's done a great job of squeezing in every little detail, including the wheel spokes and the grill on the front.*

The Naga King Mucalinda **by Pichet Paithoon**

3DA username Siam3d

Pichet says: "The beauty of Buddhist art is universal and can be perceived by everyone. In ASEAN countries we believe that Naga is the god of the river. The main programs I used were Softimage XSI and KeyShot."

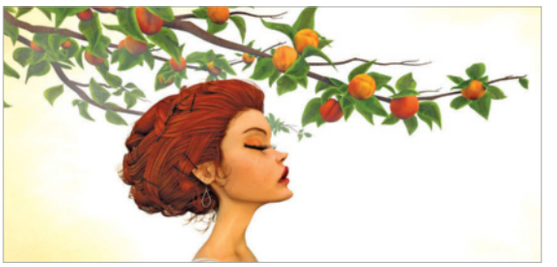
We say: *We're often seen drooling over renders of an awesome clay sculpt, and that's exactly what we did when we first laid our eyes on Pichet's excellent reimagining of a Buddhist deity.*

Ford Wheel **by Mischa Annen**

3DA username Mischa

Mischa says: "Originally part of a car project, I liked the outcome a lot so I made it into its own image by making use of MODO and Affinity Designer. The tread is a displacement map, and the sidewall a normal map."

We say: *Those tyre treads are extremely detailed, and we love how Mischa has emulated a proper industrial beauty shot. Good stuff.*



Last Morning of Spring **by Jason Knight**

3DA username jsgknight

Jason says: "This was inspired by the work of Kmye Chan and deeply influenced by other great character artists. It was an attempt at developing my character design skills, whilst concentrating on more sophisticated hair."

We say: *We really like the abstract quality that Jason has captured here with the girl's exaggerated features. Great work with the hair, too!*

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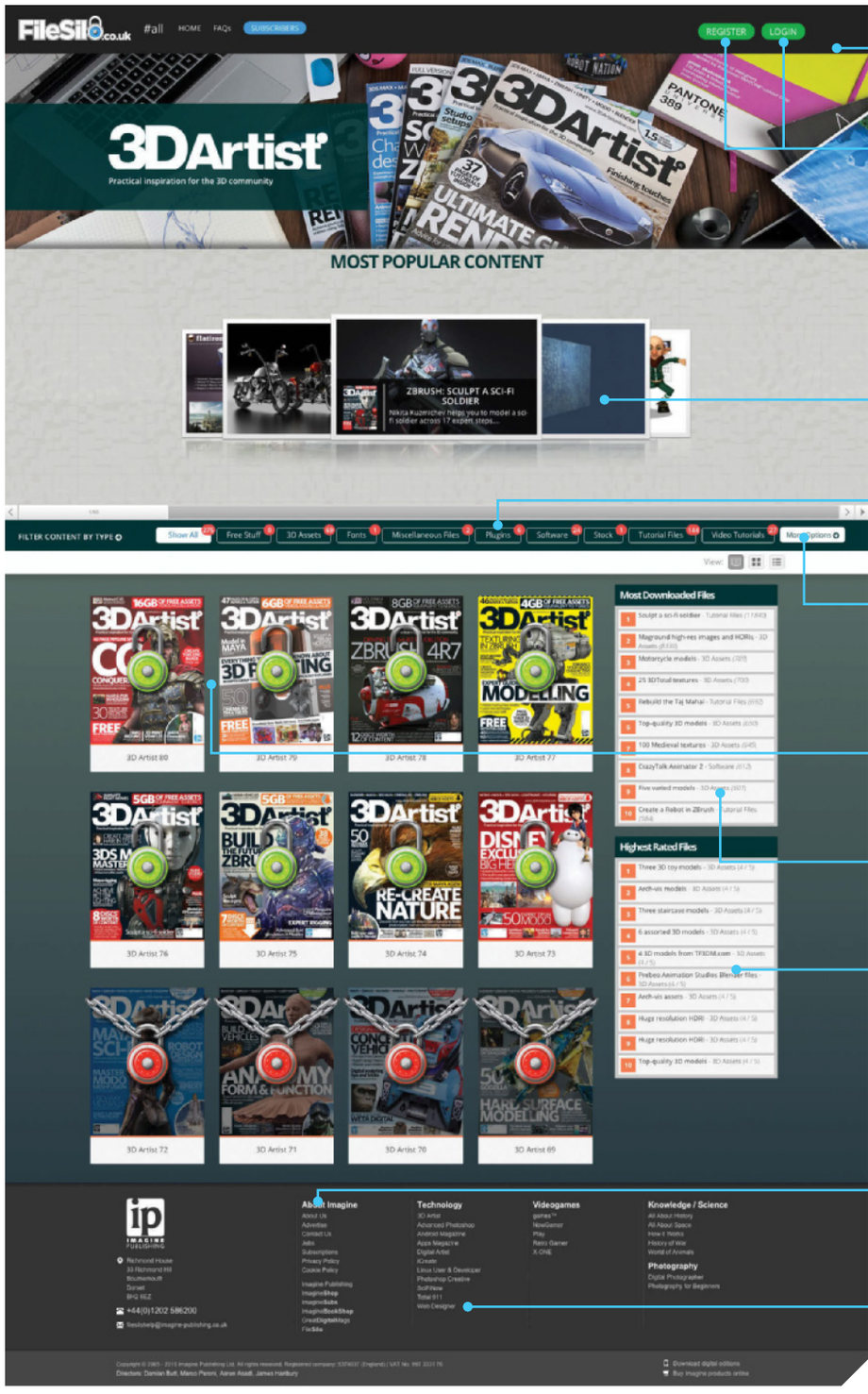

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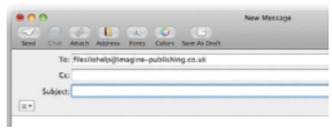

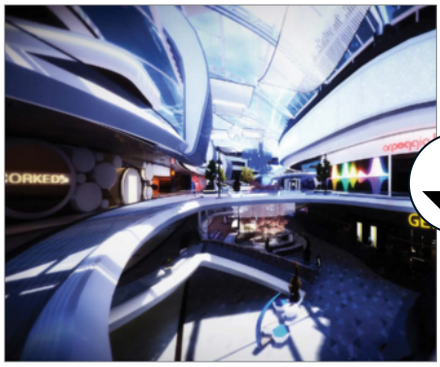

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Issue 90 of **3DArtist** is on sale **27 January 2016** from **GreatDigitalMags.com**

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